

Journal of Mycology

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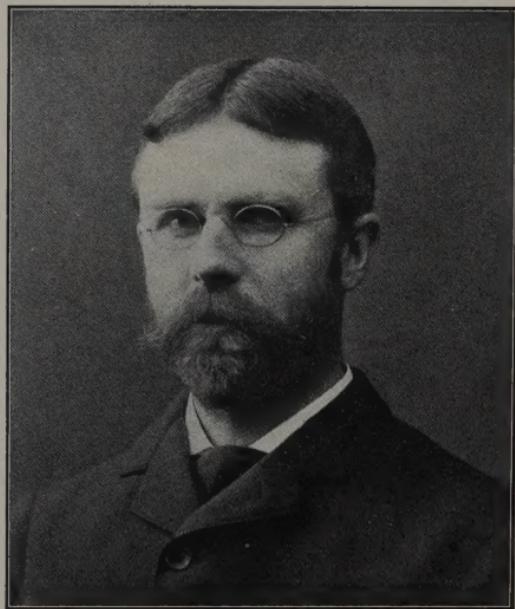
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VOLUME 10—MARCH 1904

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A NEW MELOGRAMMA.

A. P. MORGAN.

MELOGRAMMA PATENS Morgan n. sp.—Stroma depressed-pulvinate, cinereous then black, the surface mammillate by the numerous subjacent perithecia. Perithecia, small, ovoid, papillate, lying in a single layer. Asci cylindric, with a short stalk, octosporous, paraphysate, 120-130 x 7-9 mic.; spores fusiform, slightly curved, 3-septate, yellow-brown, 18-22 x 6-7 mic.

Growing on dead branches of *Carpinus americana*, Preston, Ohio, 1896. Stromata gregarious, seated on the inner bark and erumpent through the periderm, 2-3 mm. in diameter, containing from 50 to more than 100 perithecia.

The nearest relative to this species appears to be *Melogramma caucasicus* Jaczewski. The common *Melogramma vagans* DeNot. grew along with it on the same branches, sometimes mingled together, but the difference between them is perfectly obvious to the naked eye.

SOME FUNGI COLLECTED IN NEW MEXICO.

T. D. A. COCKERELL.

For several years I have been preparing a catalogue of the fungi of New Mexico; but it is still hardly more than a fragment, and I do not suppose I shall ever be able to make it anything better, now that I have moved to Colorado. It contains, however, some records which seem worth publishing, as additions

to the New Mexico flora, new host-records, etc., and these are presented herewith. I give in every case the name of the mycologist who kindly identified my material. The material was collected by myself, except when the collector's name is cited.

Agaricus campestris L. Pecos (W. P. Cockerell).
Coprinus atramentarius (Bull.) Fr. Pecos (M. Graham).
Coprinus micaceus (Bull.) Fr. Pecos (Mrs. Cora W. Hewett).
Stropharia stercoraria Fr. det. Peck. Pecos, prox. 6800 ft.
Polyporus arcularius (Batsch) Fr. det. Peck. Pecos.
Geaster hygrometricus Pers. det. Ellis. Soledad Cañon, Organ Mts.
Geaster floriformis Rit. det. V. S. White. Las Vegas Hot Springs, prox. 7000 ft.
Chondrioderma floriforme (Bull.) Bosc. det. Ellis. Beulah, prox. 8000 ft.
Trichothecium roseum Fr. det. Ellis. Mesilla, on dead wood of *Sambucus mexicana*.
Plowrightia morbosa (Schw.) Sacc. det. F. W. Patterson. Placita, near Las Vegas, on *Prunus demissa*.
Erysiphe communis (Wallr.) Fr. det. Patterson. Las Vegas, on *Polygonum*.
Erysiphe cichoracearum DC. det. Patterson. Pecos, on *Verbena macdougalii* Heller.
Pseudopeziza medicaginis (Lib.) Sacc. det. Patterson. Roswell, on alfalfa.
Tubicularia vulgaris Tode. det. Patterson. Placita, on *Prunus demissa*.
Peridermium ephedrae Cke. det. Ellis. East of Las Cruces, on *Ephedra trifurca*.
Phyllachora dasylirii (Pk.) det. Ellis. Soledad Cañon, on *Dasyliion wheeleri*.
Melampsora farinosa (Pers.) det. Ellis. Sante Fé, on *Salix*.
Phragmidium rubi (Pers.) Wint. det. Earle. Las Vegas.
Phragmidium occidentale Arthur. det. Earle. Beulah, on *Rubus deliciosus*.
Phragmidium speciosum Fr. det. Patterson. Pecos, on *Rosa pecosensis* Ckll.
Uredo ribicola C. & E. det. Ellis. Las Vegas.
Uromyces scaber E. & E. det. Ellis. Las Vegas, perhaps on *Stipa vaseyi*.
Uromyces limonii DC. (probably) det. Ellis. Nine miles south of Tularosa, on *Limonium limbatum* Small.
Uromyces hyalinus Pk. det. Earle. Las Vegas, on *Sophora sericea*.

Aecidium lepidii Tr. & Gall. det. Ellis. Hagerman (Pecos Valley), on *Lepidium alyssoides*.

Aecidium ranunculacearum DC. det. Earle. Las Vegas, on *Ranunculus cymbalaria*.

Aecidium sommerfeltii Johans. det. Earle. Beulah, on *Thalictrum fendleri* Engelm.

Aecidium hydrophylli Pk. det. Earle. Beulah, on *Hydrophyllum fendleri* (Gray) Heller.

Aecidium allenii Clinton det. Earle. Beulah, on *Lepargyreya canadensis*.

Aecidium aquilegiae Pers. det. Earle. Beulah, on *Aquilegia*.
(Coll. W. P. Cockerell.)

Aecidium phaceliae Pk. det. Earle and Patterson. Beulah, on *Phacelia cerninata*.

Aecidium brandegei Pk. det. Earle. Las Vegas, on *Asclepias*.
(Coll. Clara Gerhardt.)

Aecidium monoicum Pk. det. Patterson. Las Vegas, on *Sophia incisa*, greatly distorting the plant.

Aecidium clematidis DC. det. Patterson. Pecos, on *Clematis ligusticifolia*.

Puccinia tanaceti DC. det. Ellis. Las Vegas.

Puccinia delphinii Diet. & Holw. det. Earle. Sapello Cañon, on *Delphinium sapellonis* Ckll.

Puccinia cryptandri Ell. & Barth. det. Earle. Las Vegas Hot Springs, on *Sporobolus cryptandrus*.

Puccinia gutierreziae E. & E. det. Ellis and Patterson. Glorieta, on *Gutierrezia sarothrae*; also at Mesilla, on *Isocoma wrightii*, and at Mescalero.

Puccinia helianthi, variety. det. Ellis. Mesilla, on *Helianthus ciliaris*.

Puccinia evadens Hark. det. Ellis. Mesilla, on *Baccharis glutinosa* Pers.

Puccinia veratri Niessl. det. Earle. Beulah, on *Veratrum*.

Puccinia xanthii Schw. det. Patterson. Roswell, on *Xanthium commune* Britton.

Puccinia sphaeralceae E. & E. det. Patterson. Roswell, on *Sphaeralcea cuspidata*; Pecos, on *Sphaeralcea fendleri lobata*.

Puccinia tosta Arthur det. Patterson. Albuquerque, on *Sporobolus asperifolius*.

Puccinia malvastri Pk. det. Patterson. Las Vegas, on *Malvastrum cockerelli* A. Nelson. Also Bovina, Texas, on the same plant.

Puccinia menthae Pers. (aecidial stage) det. Patterson. Pecos, on *Monarda stricta*.

NOTES ON CALIFORNIAN UREDINEÆ AND DESCRIPTIONS OF NEW SPECIES.

W. R. DUDLEY AND C. H. THOMPSON.

PUCCINIA ANACHORETA Hark. Bull. Calif. Acad. Sc. 1:34.
Feb. 1884.

II. Hypophylloous, sori scattered, sparse or abundant, small, .5-2 mm. long, oblong, surrounded by the ruptured epidermis, light yellow; spores globose, 18-23 μ in diameter, walls rather thick, finely echinulate.

III. Hypophylloous, sori like those of II but separate from them though on the same leaf, very dark brown; spores dark brown, broadly elliptical, not at all constricted, or slightly so, at the septum, the two cells of equal size with rounded base and apex, walls rather thick, uniformly covered with minute hyaline tubercles; 29-33 x 34-40 μ ; pedicels hyaline, equaling the spore length, fragile, breaking away near the spore.

II. III. On leaves of *Calochortus albus*. Santa Cruz. May 1900. (Thompson).

This material was compared with the type material in the herbarium of the California Academy of Science and proved to be the same species with some variation in the size of the teleutospores. The original description gives the size as 20-24 x 28-42 μ but on measuring some of the type material we found the spores to be 27.5-32.5 x 31.2-37.5 μ . "Constricted" at the septum is certainly the exception and not the rule in both the type and in our own material. This adds the uredo stage to the published description.

PUCCINIA NODOSA Ell. & Hark. Bull. Calif. Acad. Sc. 1:27.
Feb. 1884.

I. Amphigenous; spots oblong, 1-4 mm. long, conspicuous, orange-yellow; aecidia few, irregularly collected in groups, small, short, rising but slightly above the longitudinally split epidermis, borders very irregularly lacerated, not recurved; spores mostly globose, a few irregularly angular oblong to obovate, wall medium thick, very minutely tuberculate, 25-37.5 x 25-37.5 μ .

II. Amphigenous; scattered, small, oblong. 1 mm. long, pustulate, opening by a single split in the epidermis parallel with the leaf, the epidermis crowded back by the protruding spores but not ruptured, dark chestnut-brown; spores globose, oblong to obovate, walls minutely and closely echinulate, yellow, contents finely granular, orange colored, germ-pores several, scattered over the spore, 30-32.5 x 30-42.5 μ .

III. Amphigenous; sori mostly .5-1.5 mm. long, rarely 4 mm. long, by .5 mm. wide, pustulate, opening by a single longitudinal split, the epidermis crowded to either side, as a wall, by the protruding spores, black; spores mostly oblong to short ob-

long, rounded at base and apex though sometimes tapering in both, usually not constricted at the septum, occasionally slightly so, walls uniformly and moderately thick, very coarsely tuberculate, almost opaque black, $26.2-37.5 \times 47.5-70 \mu$; pedicel thick, half the length of the spore, hyaline, deciduous. Paraphyses present at border of sorus, irregularly bent clavate, hyaline.

The above description is made entirely from our own material and adds stages I and II to the published description. This material was compared with the type material in the Harkness herbarium of fungi in the California Academy of Science and found to be identical with it. Owing to the meagreness of the type material only a small number of spores could be examined. These measured $30-35 \times 43.7-50 \mu$, while in the original description they are given as $22-28 \times 36-42 \mu$. "Septum scarcely visible" was probably due to the almost opaque condition of the cell wall. The pedicel is also described "as long as the spore." A number of sections through the leaf of our material, having the spores attached, failed to show any equaling the spore length but all were quite uniformly half the length of the spore.

I. II. On *Brodiaea capitata*. Rocky point near Searsville Lake, San Mateo County. Jan. 24, 1904. (Thompson).

III. Same host and location as I. and II. April 19, 1903. (Thompson).

Puccinia moreniana Dudley & Thompson n. sp.

III. Hypophylloous; sori scattered, pustulate, round to long-oblong, $1-3 \times 1-12$ mm., for some time covered by the epidermis which at length breaks away irregularly, leaving the sori naked, pulverulent, chestnut-brown; spores very irregular in size and frequently so in shape, the more common form being oblong with rounded or obliquely tapering apex and rounded or tapering base, moderately constricted at the septum, $16.2-21.2 \times 30-40 \mu$, averaging $19 \times 35 \mu$. Variations in length and diameter give a measurement range of $16.2-25 \times 30-43.7 \mu$. Unicellular spores of various sizes and shapes are frequent. All spores are light brown, walls thin throughout, smooth; pedicel long, $30-60 \mu$, tapering, rough, fragile, readily breaking away at the spore.

On *Brodiaea capitata*, by the old cement mill, Searsville Lake, at the base of Sierra Morena, San Mateo County. April 19, 1903. (Thompson).

Puccinia monardellae Dudley & Thompson n. sp.

I. Causes a swollen distortion of the young twigs, either the whole or only the basal portion of the twig, the leaves on these parts correspondingly distorted; over the surface of both are scattered the aecidia; the swollen twigs have a purple epidermis; aecidia long and slender cylindrical with irregularly lacerated margins which are not recurved; spores irregularly angular, globose to oblong, very minutely and closely verrucose, con-

tents granular with conspicuously large oil globules, $16.2-25 \times 23.7-38.7 \mu$.

II. Hypophyllous, sori round, scattered, pale tawny yellow, small; spores globose to slightly angular, almost hyaline, minutely and sparsely echinulate, thin walls, contents granular, $22.5-25 \mu$ in diameter.

III. Hypophyllous, sori round, small, scattered or occasionally forming rings, black, pulverulent; spores very dark reddish brown, short elliptical, slightly or more usually not at all constricted at the septum, rounded at both base and apex, cells equal in size, walls rather thick, closely beset over both cells with medium large transparent papillae, $22.5-25 \times 25-31.2 \mu$; pedicel stout, hyaline or sometimes slightly colored next the spore, spatulate flattened near the base, about 5μ in diameter by $50-62.5 \mu$ long.

This species shows relationship to *P. menthae*, but a comparison of it with abundant material of the latter from both America and Europe shows many conspicuous and constant differences which readily separate it from that species,—the very dark brown teleutospores, the dense covering of papillae on the basal cell as well as the apical one, the absence of any prominent apical papilla, and the stout pedicel which is comparatively short and conspicuously spatulate flattened near the basal end.

On *Monardella villosa*, Santa Cruz, June-July 1902-3. (Thompson.) *Searsville ridge*, San Mateo County, Jan., Mar. 1903. (Thompson.) *M. undulata*, Point Rayes, July 1903. (Elmer.) Distributed under *Puccinia menthae* Pers. in *Fungi Columbiani*, no. 188 b, on *Monardella villosa*, Berkeley, June 1893. (Blasdale).

Puccinia micromeriae Dudley & Thompson n. sp.

I. Aecidia closely scattered on under surface of the leaves and along the stem, diminishing the former in size and causing the latter to grow strictly erect (the normal branches being prostrate trailing); basal portion of the aecidia hemispherical, from the top of which extends the long white cylinder, $3-4.5 \times 5.6-10.5$ mm. irregularly jagged on the margin, not revolute, readily breaking away so that older individuals are much shorter; spores angular ovoid, oblong or globose hyaline, walls medium thick, minutely and closely verrucose, $16.2-21.2 \times 25-32.5 \mu$.

II. Hypophyllous; sori scattered or clustered, in the latter case somewhat discoloring a spot on the leaf to straw-yellow, small, round, pale pinkish yellow, fading on drying; spores mostly elliptical-oblong, frequently ovoid, nearly transparent, wall thin, finely echinulate, contents granular, $18.7-21.2 \times 25-30 \mu$.

III. Sori mostly on the angles of the trailing stems from which grow the distorted branches which bear the aecidia, rarely found on the under surface of the leaf on the veins, very small, $1.1-1.9 \times 3-3.7$ mm., dark brown, surrounded by ruptured epi-

dermis, spores very free (not crowded); spores reddish-brown, oblong, very slightly constricted at the septum, the two cells equal in size, walls thick, verrucose over the terminal cell and about half way down on the basal cell, base and apex round, a large low apical papilla frequently present but not at all conspicuous, $24\text{--}27.5 \times 29\text{--}34 \mu$; pedicel hyaline, tapering downward, $37.5\text{--}44 \mu$ long, fragile, usually breaking off to about the length of the spore.

Allied to *P. menthae* but differing in the aecidial stage in the strictly erect form of the distorted branches of the host, and the bulbous base of the aecidia; in the uredo stage in oblong spores, never globose; in the teleuto stage in the thick wall which is more thickly verrucose, the less prominent apical papilla, less marked constriction at the septum and greater size of the spores.

I. II. III. On *Micromeria chamissonis*, Santa Cruz, June-July, 1903. I. and II. very abundant, III. rarely found. (Thompson); II. Big River, Mendocino County, June 14, 1903. (McMurphy.)

UROMYCES ATRO-FUSCUS Dudley & Thompson n. sp.

I. Amphigenous; spots small, pale yellow; sori round to short elliptical, scattered or clustered but not at all confluent, standing out prominently from the host, brown-black.

II. Spores scattered among the teleutospores, not abundant, elliptical, $16\text{--}17.5 \times 25\text{--}26 \mu$, rather thickwalled, echinulate, germ-pores conspicuous, equatorial.

III. Spores dark brown, obovate or not infrequently globose, more or less rounded, angular, $19\text{--}26 \times 25\text{--}31 \mu$, wall thick, slightly more so at the apex, papillate, strongly so on the upper half of the spore but less so on the lower half; pedicel hyaline 2.5-3 times the length of the spore, but fragile and usually breaking away near the spore.

On *Carex douglasii*, near Palmers, Mariposa County, June 22, 1894. (J. W. Congdon.) *Carex usta*, Bear Valley, San Bernardino County, Aug. 7, 1902. (L. R. Abrams, no. 2920.)

OHIO FUNGI. FASCICLE IX.

W. A. KELLERMAN, OHIO STATE UNIVERSITY.

List of Species and Hosts.

161. *Bovista plumbea* Pers.
162. *Cercospora helianthi* E. & E., on *Helianthus hirsutus* Raf.
163. *Coleosporium campanulae* (Pers.) Lév., on *Campanula americana* L.
164. *Elvingia megaloma* (Lév.) Murrill, on stumps and logs.
165. *Entyloma menispermi* Farl. et Trel., on *Menispermum canadense* L.
166. *Melampsora salicis-capreae* (Pers.) Wint., on *Salix nigra* Marsh.
167. *Peronospora parasitica* (Pers.) DeBary, on *Dentaria laciniata* Muhl.
168. *Plasmopara sordida* Berk., on *Scrophularia marylandica* L.

169. *Plasmopara viticola* (B. & C.) Berl. & DeT., on *Vitis* sp. cult. and *Vitis vulpina* L.
 170. *Polyporus anax* Berk., on an old stump.
 171. *Polystictus cinnabarinus* (Jacq.) Fr., on old logs, mostly cherry.
 172. *Puccinia albiperidia* Arthur, on *Carex pubescens* Muhl.
 173. *Puccinia angustata* Pk., on *Scirpus atrovirens* Muhl.
 174. *Puccinia caricis-solidaginis* Arth., on *Carex stipata* Muhl.
 175. *Puccinia polygoni-amphibii* Pers., on *Polygonum virginianum* L.
 176. *Puccinia seymeriae* Burill, on *Afzelia macrophylla* (Nutt.) Kuntze.
 177. *Pucciniastrum agrimoniae* (DC.) Diet., on *Agrimonia mollis* (T. & G.) Britt.
 178. *Septoria lactucae* Pass., on *Lactuca virosa* L.
 179. *Septoria ochroleuca* B. & C., on *Castanea dentata* (Marsh.) Borkh.
 180. *Synchitrium decipiens* Farl., on *Falcata comosa* (L.) Kuntze.

161. *Bovista plumbea* Pers.

Columbus, Ohio.

October 1903.

Coll. J. H. Schaffner.

"BOVISTA PLUMBEA: minor subglobosa plumbeo-caesia. *Obs. myc.* 1. p. 5.

"Iam aestate post pluuias crescere incipit, cortice exteriore candido adhuc involuta, qui demum vt plurimum aut totus euanescit, aut de quo basi particulae stellariformes, modo eleganti, remanent. Autumno matura, colore plumbea, libera aut terrae vix innata, non infrequens reperitur."

D. C. H. Persoon. *Synopsis Methodica Fungorum*, Pars Prima, 137. 1801.

162. *Cercospora helianthi* E. & E.

On *Helianthus hirsutus* Raf.

Sandusky, Erie Co., Ohio.

Aug. 2, 1903.

Coll. W. A. Kellerman.

"CERCOSPORA HELIANTHI, E. & E.—Spots none; hyphae hypophylloous, fasciculate, olive-brown, nucleate, becoming septate, crooked above, 70-90 x 5-6 μ , forming loose, olivaceous, indefinitely-limited patches; conidia obclavate, olivaceous, nucleate, becoming 3-6-septate, 70-110 x 5-6 μ ."

J. B. Ellis & B. M. Everhart. *Journal of Mycology*, 3:20. Feb., 1887.

163. *Coleosporium campanulae* (Pers.) Lev.

On *Campanula americana* L.

Columbus, Ohio.

June, 1903.

Coll. W. A. Kellerman.

"VREDO CAMPANVLAE: Rotunda subdepressaque flavo-rubra magnitudine varia.

"Obs. Color demum, quod etiam de multis speciebus valet, ita expallescit, vt fungilli fere albidi euadant. Nonnunquam vero puluerem in vno altero indiuiduo eiusdem cespituli observauit colore spadicea distinctum." D. C. H. Persoon. *Synopsis Methodica Fvngorvm*, Pars Prima, 217. 1801.

164. *Elfvingia megaloma* (Lev) Murrill.

On stumps and logs.

Columbus, Ohio.

Oct. 1902-3.

Coll. Kellerman, Schaffner, Jennings, Frank.

"POLYPORUS (Fomentarius) LEUCOPHAEUS M. mss.: dimidatus; pileo maximo suberoso-lignoso convexo-plano tuberculato-noduloso glabro, tandem concentrica sulcato, crustaceo-laccato, ex albo lacteo cinerascente, lineolis obscurioribus fasciato, margine obtuso lactea sterili; poris minimis primo niveis tandem fuscescentibus, ore intusque albis.

"HAB. Ad trunco Americae borealis. Ohio: SULLIVANT.

"DESC. Pileus dimidiato-sessilis, semi-orbicularis, maximus, transversim 3 decimeta latus, 13-15 centim. longus, postice fere decimetrum crassus, laccatus seu crusta rigida sat crassa industus, initio lacteus, lineolis cinereis concentricis marginem versus notatus, tandem cinerascens et superficiem Sterci fasciati SCHW. referens. Margo obtusus, late sterilis, ut et hymenium junitus, candidus. Substantia durissima, floccoso-suberosa, badia. Pori longissimi, omnium minutissimi, intus nivei, ore obtuso eadem materia, qua totus fungus premitus est vestitus, initio obturati, dein obducti." J. F. Cam. Montagne. Sylloge Generum Specierumque Cryptogamarum, 157. 1856.

165. *Entyloma menispermi* Farl. et Trel.

On *Menispermum canadense* L.

Sandusky, Erie Co., Ohio.

July 5, 1903.

Coll. W. A. Kellerman.

'ENT. MENISPERMI Farlow and Trelease.

"Conidia acutely ovate, 11-24 μ by 3.5-4 μ . Spores light colored, globose or somewhat angular, smooth, with thin walls, about 5.5-11 μ in diameter." W. G. Farlow. Botanical Gazette, 8:275. Aug., 1883.

166. *Melampsora salicis-capreae* (Pers.) Wint.

On *Salix nigra* Marsh.

Columbus, Ohio.

Sept. 20, 1903.

Coll. W. A. Kellerman.

Supplement to No. 47.

167. *Peronospora parasitica* (Pers.) DeBary.

On *Dentaria laciniata* Muhl.

Columbus, Ohio.

May 5, 1903.

Coll. W. A. Kellerman.

"Botrytis parasitica: cespitosa candida, stipite deorsim simplice." D. C. H. Persoon. Observationes Mycologicae, 1:96, pl. 5. f. 6. a. b. 1796.

168. *Plasmopara sordida* Berk.

On *Scrophularia marylandica* L.

Sandusky, Erie Co., Ohio. Aug. 3, 1903.

Coll. W. A. Kellerman.

"*Peronospora sordida* n.sp. Maculis latis hypophyllis irregularibus sordide pallidis; floccis supra vase dichotomis, apicibus furcatis inaequalibus; sporis obovatis apice apiculatis.

"Forming broad, irregular, dirty, pallid spots on the under side of the leaves; threads loosely dichotomous above; tips forked, unequal; spores obovate, apiculate, .001 inch long." Berkeley and Broome. Annals and Magazine of Natural History, III. 7:449. 1861.

169. *Plasmopara viticola* (B. & C.) Berl. & DeT.

On (a) *Vitis* sp. cult., on leaves only; (b) *Vitis vulpina* L., on fruit only.

Columbus, O. (a), Sandusky, O. (b). June 10, 1900.
Coll. W. A. Kellerman.

"*P.[eronospora] viticola* (Berk. et Curt.) *Botrytis viticola* Berk. et Curt. apud Caspary, Monastber. Berl. Acad.; Berkeley, Crypt. Bot., p. 301. Mycelii tubi crassi, saepe constricti varicosique (haustoria non vidi). Stipites conidiferi fasciculatim e stomatibus emergentes, graciles, elati, summo apice parum attenuato brevissime semel bisve dichotomi v. trifurcati; sub apice ramos plerumque 4-6 (raro 3 v. 7) gerentes. Rami primarii plerumque alterno, distantes et exacte distichi, omnes pro stipitis altitudine breves; inferiores plerumque trifurcati divisionibus iterum bis trifurcati v. quandoque bis dichotomis; ramuli ultimi (quarti) ordinis, aequae ac stipitis divisiones apicales, brevissime conico-subulati recti. acuti. Rami primarii superiores minores, inferiorum secundariis v. tertiariorum conformes. Rami omnium ordinum angulis rectis patentes, primarii in uno plano divaricati, planum ramificationum secundi ordinis in primario, tertiariorum in primario et secundario perpendiculariter. (Rarius rami primarii 2 inferiores oppositi sunt, raro ramulis 2 ulterius muniti nec trifurcati, rarissime rami primarii irregulariter sparsi nec distichi sunt.) Conidia parvula, ovoidea, apice lato rotundata v. subtruncata, pavilla destituta, membrana circumcirca aequali hyalina.

Oogonia parva, membrana tenui hyalina v. lutescente oosporam foventia subglobosam episporio tenui fuscescente diaphano laevi munitam.

Habitat in America boreali, in *Vitis aestivalis* Mich., et *V. Labruscae* L. folius, ibique (teste cl. Russell in schedula) mensibus Augusto et Septembri abundat. Specimena a cl. Curtis in Carolina australi et a cl. J. L. Russel in civitate Massachusetts lecta cl. Caspary benevole mecum communicavit.

Stipites conidiferi in foliorum pagina inferiore caespites sistunt candidos densos, maculas ibi praebentes numerosas saepe confluentes. Merito sane a cl. Berkeley (l. c.) haec species distinctissimis et nobilissimis adscribitur, neque tamen caeteris "perfectior" dici potest." A. De Bary. Ann. Sci. Nat. IV. 20:125-126. 1863.

170. *Polyporus anax* Berk.

On an old stump.

Columbus, Ohio.

Oct. 20, 1902.

Coll. J. G. Sanders.

"*Polyporus (Merisma) anax*, Berk.

"*Polyporus* very much and intricately branched, the branches terminating in numerous frondose lobed pilei of various forms and sizes, imbricating and confluent, of a dusky gray, or lead colour, and somewhat downy or minutely fibrous above. The pores are white, varying in size and form, but mostly large and angular. The substance is coriaceous, brittle when dry. The smell is like that of mice, when it is in a dry state, but when moist almost inodorous.

"Found at the base of a dead stump, branching out from a thick single stem at the base, until at the top it formed a large head of branches and lobed pilei quite 16 inches in diameter. Ohio, U. S. Herb. Berk., No. 2458." M. C. Cooke. *Grevillea*, 12:87. 1883.

171. *Polystictus cinnabarinus* (Jacq.) Fr.

On old logs, mostly cherry.

Columbus, Ohio.

September 1903.

Coll. W. A. Kellerman, J. H. Schaffner, J. G. Sanders.

"*Boletus cinnabarinus*.

"*Arboribus parasiticus* accrescit in subalpinis Austriae; quem ex Carinthia etiam reverendus Franciscus Xaverius Wulffen transmisit. Fungus sessillis & horizontalis, superne convexo-planus, ruber & aequabilis; subtus planus, tenuissime nec profunde tubulosus, coccineusque; carne firma, coriacea, tenace, subrubella, aliquot lineas crassa. Antrorsum haud valde protenditur; latitudine variare a me visus ab unica ad quatuor uncias. Color in affervato diu jam perstitit." N. J. Jacquin. *Florae Austriacae*, 4:2. pl. 304. 1776.

172. *Puccinia albiperidia* Arthur.

On *Carex pubescens* Muhl.

Columbus, Ohio.

October 1902.

Coll. W. A. Kellerman.

'*PUCINIA ALBIPERIDIA* SP. NOV.

"O. Spermogonia amphigenous, small, pale orange.

"I. Aecidia hypophylloous, small in circular clusters; substratum scarcely thickened; peridia white, low, margin incised, reflexed; spores pale yellow when fresh, subglobose, 15-20 μ in diameter; wall thin, smooth.

"II. Uredosori hypophylloous, small, round or oblong, soon naked; uredospores oblong, small, echinulate.

"III. Teleutosori hypophylloous, globose or oblong, pulvinate, dark brown. Teleutospores oblong-cuneate, 17-24 by 32-45 μ ; apex semicircular or obtuse, thickened to half the length of the upper cell; side walls thin, slightly or not constricted; pedicel slender, colored, as long as the spore or shorter." J. C. Arthur. *Journal of Mycology*, 8:53. June, 1902.

173. *Puccinia angustata* Pk.On *Scirpus atrovirens* Muhl.

Edgerton, Williams Co., O. Sept. 15, 1902.

Coll. W. A. Kellerman.

Supplement to No. 26.

174. *Puccinia caricis-solidaginis* Arth.On *Carex stipata* Muhl.

Buckeye, Lake, Licking Co., Ohio. Nov. 1, 1902.

Coll. W. A. Kellerman.

For information concerning this rust see culture work by J. C. Arthur, in which he used teleutospores from *Carex jamesii* Schw. and from *Carex stipata* Muhl., obtaining aecidia on *Solidago canadensis* L. and *S. serotina* Ait. He then adds as follows:

"A comparison of this special with *P. caricis-asteris* and *P. caricis-erigerontis* [see labels 89 and 150] shows many resemblances, and it seems not improbable that the three represent more correctly the biological variations of one species." J. C. Arthur. Botanical Gazette, 35-21. January, 1903.

175. *Puccinia polygoni-amphibii* Pers.On *Polygonum virginianum* L.

Sandusky, Erie Co., Ohio. July 25, 1903.

Coll. W. A. Kellerman.

Supplement to No. 115.

176. *Puccinia seymeriae* Burrill.On *Afzelia macrophylla* (Nutt.) Kuntze.

Sandusky, Erie Co., Ohio. Aug. 3, 1903.

Coll. O. E. Jennings.

"*P. seymeriae*, Burrill.

"III. Hypophylloous, and on stems and calyces. Spots definite, dark-colored, sori rather large, mostly crowded in conspicuous circular clusters a fifth of an inch in diameter, these sometimes confluent, dark brown; spores elliptical or oval, little constricted, obtusely rounded at the ends, smooth; wall firm, brown, 15-21 by 30-36 μ ; pedicel hyaline, broad, persistent; twice as long as the spore." T. J. Burrill. Bulletin of the Illinois State Laboratory of Natural History, 2:188. 1885.

177. *Pucciniastrum agrimoniae* (DC.) Diet.On *Agrimonia mollis* (T. & G.) Britt.

Sandusky, Erie Co., Ohio. Aug. 1, 1903.

Coll. W. A. Kellerman.

Supplement to No. 116.

178. *Septoria lactucæ* Pass.

On *Lactuca virosa* L.

Columbus, Ohio.

May 1903.

Coll. W. A. Kellerman.

"*Septoria Lactucae* Pass., nov. spec.

"Maculae ferrugineæ, irregulares, angulosæ, totam folii laminam mox adurentes; perithecia minima, punctiformia, sparsa; spermatia filiformia, integra, recta vel culvula, hyalina." G. Passerini. Erbar. crittig. ital., ser. II. No. 746. 1878.

Note The same description (with the word "spora" added in parenthesis after spermatia) is given on the label in Thümen, Mycot. univ. N. 1295. The date of the latter, however, is 1879.

179. *Septoria ochroleuca* B. & C.

On *Castanea dentata* (Marsh.) Borkh.

Sandusky, Erie Co., Ohio.

July 25, 1903.

Coll. W. A. Kellerman.

"*Septoria ochroleuca*. B. & C.—Maculis parvis orbicularibus peritheciisque ochroleucis marginatis; sporis curvis utrinque acutis uniseptatis.

"Spots small, pale, surrounded by a thin, dark margin; perithecia ochroleucous, collapsed, spores curved, subfusiform, uniseptate, .001 long." M. J. Berkeley. Grevillea, 3:9. September, 1874.

180. *Synchitrium decipiens* Farl.

On *Falcata comosa* (L.) Kuntze.

Sandusky, Erie Co., Ohio.

July 9, 1903.

Coll. W. A. Kellerman.

"*UREDO ECIDIODES* n. sp.

'Spots obliterated, sori amphigenous, bullate, small, scattered or close; spores globose, at first covered by the epidermis, then surrounded by its ruptured remains, bright yellow or orange 1/1200" in diameter.

"Leaves, petioles and stems of *Amphicarpea monoica*. Common. June and July.

"When the sori are evacuated, the rather firm epidermis walls remain, forming a little cup with a narrow mouth and resembling the cups of some species of *Aecidium*." Charles H. Peck. Report on the N. Y. State Museum, 24:88. 1871.

Through inadvertancy an incorrect transcription was made for the label for No. 157, which is therefore to be discarded and the following label used instead.

157. *Marssonnia toxicodendri* (E. & M.) Sacc.

On *Rhus radicans* L.

Sandusky, Erie Co., O.

Aug. 17, 1903.

Coll. W. A. Kellerman.

"GLOEOSPORIUM TOXICODENDRI, E. & M., n. s.

"Spots amphigenous, dirty white, small (2 mm.) with a rather broad, nearly black border. Aceruli scattered, not numerous, dark colored. Spores oblong, 1-septate, 12-15 x 5-6 μ ." [corrected, 20-40 x 2 $\frac{1}{2}$ -3, mostly 22 x 30]. J. B. Ellis and B. M. Everhart. Journal of Mycology, 1:116. September, 1885.

By a clerical error Stylosanthes biflora (L.) B. S. P. was given as the host for No. 53. Please clip out from the reprint the host named below and paste same over the incorrect name on the label in the OHIO FUNGI exsiccati:

Strophostyles helvola (L.) Britt.

MINOR MYCOLOGICAL NOTES. III.

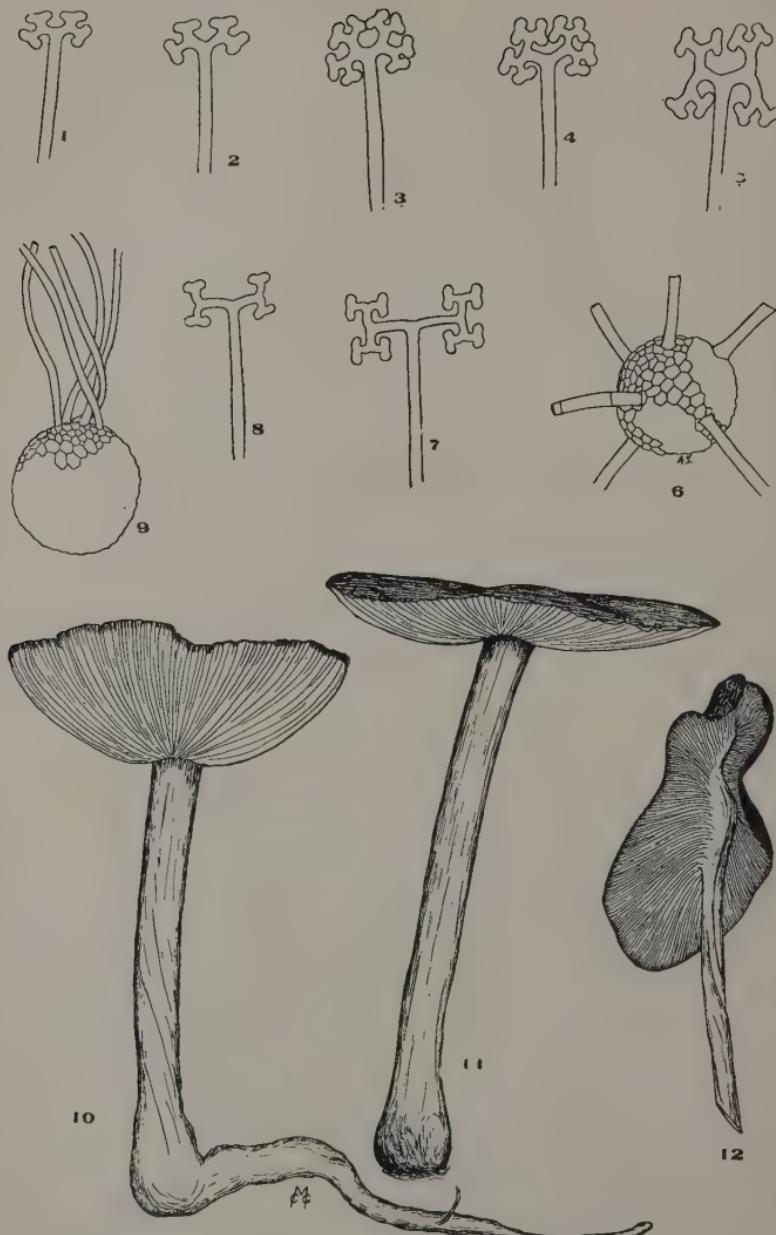
, W. A. KELLERMAN.

PODOSPHAERA TRIDACTYLA. — Having occasion to refer to herbarium specimens of *Podosphaera* recently, I was surprised to find that most of them named *P. kunzei*, *P. tridactyla* or *P. oxyacanthae* var. *tridactyla*, were not the form authoritatively named as last given. This is a repetition of the decision published by Salmon in his Monograph of the *Erysiphaceae*, in Mem. Torr. Bot. Club, 11:37 4 Oct. 1900, where he states as follows: "Without exception all the plants labelled *P. kunzei* (the name under which Léveillé united '*P. tridactyla*' and '*P. myrtillina*') that I have seen, belong to *P. oxyacanthae*."

Of the American specimens examined — more than 100, widely distributed over the United States — labelled *P. kunzei*, *P. oxyacanthae*, *P. oxyacanthae* var. *tridactyla*, and *Microsphaera fulvo-fulcra*, all prove to be typical *P. oxyacanthae* (DC.) De-Bary.

Mrs. Flora W. Patterson kindly allowed me to examine a specimen from Seattle, Wash., on *Spiraea douglasii*, originally labelled *Sphaerotheca humili*, which Salmon pronounced *P. oxyacanthae* var. *tridactyla*. The same mycologist of the United States Department of Agriculture also gave me the opportunity to examine 46 other specimens variously labeled as mentioned in the first part of this note. The specimens similarly labeled, in the Missouri Botanical Garden Herbarium were likewise generously placed at my service for critical examination. I have to thank in addition the Carnegie Museum and other parties for similar kindness with reference to their specimens.

All American specimens proved to be *Podosphaera oxyacanthae* — the only *P. tridactyla* found being the Seattle specimen alluded to above. Several European specimens labeled *P. tridactyla* and *P. oxyacanthae* were examined and generally found true to name. When labeled *P. kunzei* they were readily referred to *P. oxyacanthae*, or to *P. tridactyla*. It is thought remarkable, if not quite inexplicable, that *P. tridactyla* should be found on the single host and in the single locality in this country.



PODOSPHÆRA OXYACANTHÆ, P. TRIDACTYLA, AND CALLYBIA RADICATA.

I have been impressed with the marked characteristics of *P. tridactyla* — especially the location and direction of the appendages, and their striking dichotomous tips — and do not hesitate to label this form as a true species, not a variety of *P. oxyacanthae* as is done in Salmon's Monograph.

Referring to Earle's "Notes on the North American forms of *Podosphaera*," in the Botanical Gazette, 9:25-6, Feb. 1884, it is to be observed that this mycologist evidently did not have any true *P. tridactyla*; the decision that all his forms represented only one species was undoubtedly correct and he properly retained the name *Podosphaera oxyacanthae* (DC.) DeBary. The portion of his statement of interest here is as follows: "The differences that do appear are chiefly in the size of the perithecia and in the number and length of the appendages. As these vary more widely in perithecia from the same leaf than do the averages of the different forms, there seems no ground for their separation into distinct species, unless we allow more weight to the difference of host plant than is usual in the *Erysiphei*; but they should be considered as belonging to a large, widespread, variable species, comparable with *Erysiphe lamprocarpa*, Lév. and *Microsphaera penicillata*, Lév."

It has seemed desirable, even if my "note" is somewhat lengthened, to furnish the evidence for the opinion above expressed as to the autonomy of the form under consideration; accordingly outline figures have been reproduced on Plate 73. The Figs. 1-6, sufficiently explained below, represent *P. oxyacanthae*. In marked contrast to these are Figs. 7-9, which represent *P. tridactyla* — Fig. 7 drawn from a European specimen, and Figs. 8 and 9 from the Seattle (Washington) specimen. The dichotomous tip has its branches placed at right angles and usually they are much elongated — never so directed in *P. oxyacanthae*. The apical insertion of the appendages which are erect — at least more or less so — is also characteristic (Fig. 9). There is no approach to the more or less equatorial or basal insertion, and horizontally spreading appendages as in the case of *P. oxyacanthae* (Fig. 6).

Those interested in the synonymy would consult Salmon's complete list in the Monograph. But it may here be remarked that Wallroth in 1838 named the plant *Alphitomorpha tridactyla*; in 1851 it was listed as *Podosphaera kunzei* by Léveillé — which includes the species under consideration as well as the typical *P. oxyacanthae*; in 1870 we find the following satisfactory designation: PODOSPHAERA TRIDACTYLA (Wallr.) DeBary.

EXPLANATION OF FIGS. 1-9, PLATE 73.

Fig. 1 shows tip of appendage of *Podosphaera oxyacanthae*, specimen from West Virginia (Millspaugh). Fig. 2, ditto, from Missouri (Tracy & Galloway). Figs. 3 and 4, ditto, from Kansas (Kellerman & Swingle). Fig. 5, ditto, from Maine (Ricker). Fig. 6, Perithecium from *P. oxyacanthae*, S. Dakota (Griffiths). Fig. 7, tip of appendage of *P. tridactyla* from Germany (Krieger). Fig. 8, ditto, from Seattle, Washington (Parker). Fig. 9, Perithecium also from latter specimen.

ABNORMAL COLLYBIA RADICATA.—When collecting Mushrooms near Sandusky, Ohio, the past season, some specimens of *Collybia radicata* were found in peculiar habitat, but they had adjusted themselves advantageously to the situation. They were growing on a rotten log, only the upper side of which had completely rotted away. The specimens were unable to send their "root" into the rotten wood, and in one case no such prolonged stipe was developed. In the other specimen the root-like portion, peculiar to this species, took a horizontal direction, applying itself closely to the moist surface of the decaying log. Sketches of these two abnormal forms are shown in Figs. 10 and 11, Plate 73. On the same plate is shown a specimen from a distant locality in which the cap is tipped up on one side by the abnormal lateral growth of the apical portion of the stipe; see Fig. 12.

INDEX TO UREDINEOUS CULTURE EXPERIMENTS
WITH LIST OF SPECIES AND HOSTS FOR
NORTH AMERICA. I.

W. A. KELLERMAN.

(Concluded from p. 45.)

Puccinia sambuci (Schw.) Arth. n. n. aecidiospores [Aecidium *sambuci* Schw.] from *Sambucus canadensis* (*Puccinia sambuci* (Schw.) Arth. [*P. bolleyana* Sacc.]) uredo on *Carex trichocarpa*. J. C. Arthur. Bot. Gaz. 35:15. Jan. 1903.

Puccinia sambuci (Schw.) Arth. aecidia (Aecidium *sambuci* Schw. on *Sambucus canadensis*), *see* *Puccinia sambuci* (Schw.) Arth. (*P. bolleyana* Sacc.) from *Carex trichocarpa* Muhl. [Arthur]

Puccinia sambuci (Schw.) Arth. [*P. bolleyana* Sacc.] uredo on *Carex trichocarpa*, *see* *Puccinia sambuci* (Schw.) Arth. aecidiospores (Aecidium *sambuci* Schw.) from *Sambucus canadensis*. [Arthur]

Puccinia sambuci (Schw.) Arth. n. n. (*P. bolleyana* Sacc.) from *Carex trichocarpa* Muhl (*Puccinia sambuci* (Schw.) Arth. aecidia [Aecidium *sambuci* Schw.] on *Sambucus canadensis*). J. C. Arthur. Bot. Gaz. 35:15. Jan. 1903.

Puccinia simillima Arth. from *Phragmites phragmites* (L.) Karst. (*P. communis* Trin.) (Aecidium *ranunculacearum* (?) on *Anemone canadensis*). J. C. Arthur. Bot. Gaz. 35:20. Jan. 1903.

Puccinia subnitens Diet. from *Distichlis spicata* (L.) Greene (Aecidium *ellisii* Tr. & Gall. on *Chenopodium album* L.). J. C. Arthur. Bot. Gaz. 35:19. Jan. 1903.

PUCCINIA subnitens Diet. from *Distichlis spicata* (L.) Greene
(aecidia [Aecidium ellisii Tr. & Gall.] on *Chenopodium al-*
bum L. W. A. Kellerman. Jour. Mycol. 9:234. Dec.
1903.

PUCCINIA verbenicola (K. & S.) Arth. n. n., *see* *Puccinia vilfae*
A. & H. [P. verbenicola (K. & S.) Arth.] from *Sporobolus*
longifolius (Torr.) Wood. [Arthur]

PUCCINIA vilfae A. & H. aecidia [Aecidium verbenicola K. & S.]
on *Verbena stricta* Vent. and *V. urticifolia* L., *see* *Puccinia*
vilfae A. & H. [P. verbenicola (K. & S.) Arth.] from *Sporo-*
blus longifolius (Torr.) Wood. [Arthur]

PUCCINIA vilfae A. & H. aecidiospores (Aecidium verbenicola K.
& S.) from *Verbena stricta* (*Puccinia vilfae* A. & H. uredo
on *Sporobolus longifolius*). J. C. Arthur. Bot. Gaz. 29:274.
April 1900.

PUCCINIA vilfae A. & H. [P. verbenicola (K. & S.) Arth. n. n.
from *Sporobolus longifolius* (Torr.) Wood (*Puccinia vilfae*
A. & H. aecidia [Aecidium verbenicola K. & S.] on *Verbena*
stricta Vent. and *V. urticifolia* L.). J. C. Arthur. Bot. Gaz.
35:16. Jan. 1903.

PUCCINIA vilfae A. & H. uredo on *Sporobolus longifolius*, *see*
Puccinia vilfae A. & H. aecidiospores (Aecidium verbenicola
K. & S.) from *Verbena stricta*. [Arthur]

PUCCINIA windsoriae Schw. aecidia [Aecidium pteleae B. & C.]
on *Ptelea trifoliata* L., *see* *Puccinia windsoriae* Schw. from
Tricuspid seslerioides Torr. (*Triodia cuprea* Jacq.) [Ar-
thur]

PUCCINIA windsoriae Schw. aecidiospores (Aecidium pteleae B.
& C.) from *Ptelea trifoliata* (*Puccinia windsoriae* Schw.
uredo on *Triodia cuprea* (*Sieblingia seslerioides* Scrib.)).
J. C. Arthur. Bot. Gaz. 32:273. April 1900.

PUCCINIA windsoriae Schw. from *Tricuspid seslerioides* Torr.
(*Triodia cuprea* Jacq.) (*Puccinia windsoriae* Schw. aecidia
[Aecidium pteleae B. & C.] on *Ptelea trifoliata* L. J. C.
Arthur. Bot. Gaz. 35:16. Jan. 1903.

PUCCINIA windsoriae Schw. from *Tricuspid seslerioides*
(Aecidium pteleae on *Ptelea trifoliata*). W. A. Kellerman.
Jour. Mycol. 9:10. Feb. 1903.

PUCCINIA windsoriae Schw. uredo on *Triodia cuprea* (*Sieblingia*
seslerioides Scrib., *see* *Puccinia windsoriae* Schw. aecidio-
spores (Aecidium pteleae B. & C.) from *Ptelea trifoliata*.
[Arthur]

PUCCINIA windsoriae Burr. non Schw., *see* *P. hibisciata* (Schw.)
Kellerm. n. n.

PYRUS americana (Roestelia "lacerata z" [R. globosum Thax. as later used], *see* *Gymnosporangium globosum* from *Juniperus [virginiana]*. [Thaxter]

PYRUS americana (Roestelia sp. ? spermogonia only), *see* *Gymnosporangium globosum* from [*Juniperus virginiana*]. [Thaxter]

PYRUS arbutifolia (Roestelia transformans [?]), *see* *Gymnosporangium ellisii* from [*Cupressus* sp.]. [Thaxter]

PYRUS arbutifolia (——? spermogonia), *see* *Gymnosporangium clavipes* from [*Juniperus virginiana*]. [Farlow]

PYRUS arbutifolia (——? spermogonia), *see* *Gymnosporangium macropus* from *Juniperus virginiana*.] Farlow[

PYRUS iowensis (Roestelia pyrata), *see* *Gymnosporangium macropus* from *Juniperus virginiana*. [Pammel]

PYRUS malus (Roestelia "lacerata z" [R. globosum Thaxter as later used], *see* *Gymnosporangium globosum* from *Juniperus [virginiana]*. [Thaxter]

PYRUS malus (——? spermogonia), *see* *Gymnosporangium clavipes* from [*Juniperus virginiana*]. [Farlow]

PYRUS malus (——? spermogonia), *see* *Gymnosporangium globosum* from *Juniperus virginiana*. [Farlow]

PYRUS malus (——? spermogonia), *see* *Gymnosporangium macropus* from *Juniperus virginiana*. [Farlow]

PYRUS malus (spermogonia only) (Roestelia aurantiaca), *see* *Gymnosporangium clavipes* from [*Juniperus virginiana*]. [Thaxter]

PYRUS malus (spermogonia only) (Roestelia cornuta), *see* *Gymnosporangium conicum* from [*Juniperus virginiana*]. [Thaxter]

PYRUS malus (Roestelia pyrata), *see* *Gymnosporangium macropus* from [*Juniperus virginiana*]. [Thaxter]

PYRUS malus (Roestelia sp.? spermogonia only), *see* *Gymnosporangium globosum* from [*Juniperus virginiana*]. [Thaxter]

RANUNCULUS abortivus L. (*Puccinia eatoniae* Arth.), *see* *Aecidium ranunculi* Schw. from *Ranunculus abortivus* L. [Arthur]

RHAMNUS lanceolata (*Puccinia coronata* Corda on *Avena sativa*, *Phalaris caroliniana*, *Arrhenatherum elatius*), *see* *Puccinia coronata* Corda aecidiospores from *Rhamnus lanceolata*. [Carleton]

RIBES cynosbati L. (*Aecidium albiperidia* Arth.), *see* *Puccinia albiperidia* Arth. from *Ribes cynosbati* L. [Arthur]

RIBES cynosbati L. (spermogonia and aecidia), *see* *Puccinia albiperidia* Arth. teleutospores from *Carex gracillima* Schw. [Arthur]

ROESTELIA aurantiaca on *Amelanchier canadensis* and *Pyrus malus* (spermogonia), *see* *Gymnosporangium clavipes* from [*Juniperus virginiana*]. [Thaxter]

ROESTELIA botryapites on *Amelanchier canadensis*, *see* *Gymnosporangium biseptatum* from [*Cupressus thyoides*]. [Thaxter]

ROESTELIA botryapites Schw. on *Amelanchier* [canadensis] and *A. botryapium*, *see* *Gymnosporangium clavariaeforme* DC. from *Juniperus communis*. [Halsted]

ROESTELIA cornuta on *Amelanchier canadensis* and *Pyrus malus* (spermogonia only), *see* *Gymnosporangium conicum* from [*Juniperus virginiana*]. [Thaxter]

ROESTELIA globosum, *see* *Roestelia "lacerata z"* [Thaxter]

ROESTELIA lacerata on *Crataegus tomentosus*, *see* *Gymnosporangium clavariaeforme* from [*Juniperus communis*]. [Thaxter]

ROESTELIA "lacerata z" [*R. globosum* Thax. as later used] on *Pyrus malus*, *Pyrus americana*, and *Crataegus crus-galli*, *see* *Gymnosporangium globosum* from *Juniperus* [virginiana]. [Thaxter]

ROESTELIA nidus-avis on *Cydonia* (quince) and *Amelanchier canadensis*, *see* *Gymnosporangium nidus-avis* Thax. nov. sp. from *Juniperus virginiana*. [Thaxter]

ROESTELIA [penicillata] on *Pirus coronaria*, *see* *Gymnosporangium macropus* from *Juniperus virginiana*. [Halsted]

ROESTELIA pirata on *Pirus malus* cult., *see* *Gymnosporangium macropus* from *Juniperus virginiana*. [Stewart & Carver]

ROESTELIA pyrata on *Pyrus iowensis*, *see* *Gymnosporangium macropus* from *Juniperus virginiana*. [Pammel]

ROESTELIA pyrata on *Pyrus malus*, *see* *Gymnosporangium macropus* from [*Juniperus virginiana*]. [Thaxter]

ROESTELIA transformans (?) on *Pyrus arbutifolia* and (?) *Amelanchier canadensis*, *see* *Gymnosporangium ellisi* from [*Cupressus* sp.]. [Thaxter]

ROESTELIA sp.? (spermogonia only) on *Crataegus coccinea*, *Pyrus americana*, and *Pyrus malus*, *see* *Gymnosporangium globosum* from [*Juniperus virginiana*].]Thaxter[

ROSA (hardy garden rose) ([*Phragmidium speciosum* Fr.] spermogonia on *Rosa humilis*), *see* *Phragmidium speciosum* Fr. from *Rosa* (hardy garden rose). [Arthur]

ROSA humilis ([*Phragmidium speciosum* Fr.] spermogona), *see* *Phragmidium speciosum* Fr. from *Rosa* (hardy garden rose). [Arthur]

ROSA [Tea rose, Kaiserin Augusta Victoria] (*Caeoma miniata* Am. Auct.), *see* *Phragmidium speciosum* Fr. from *Rosa* sp. [Arthur]

ROSA sp. (*Caeoma miniata* Am. Auct. on *Rosa* [Tea rose, Kaiserin Augusta Victoria]), *see* *Phragmidium speciosum* Fr. from *Rosa* sp. [Arthur]

RUBUS villosus, *see* *Rubus occidentalis* and *R. villosus*. [Clinton]

RUBUS occidentalis and *R. villosus* (*Gymnoconia interstitialis*, teleutospores [*Puccinia peckiana* Howe]), *see* *Gymnoconia interstitialis* (*Caeoma nitens* Schw.) from *Rubus occidentalis* and *R. villosus*. [Clinton]

RUBUS occidentalis and *R. villosus* (*Gymnoconia interstitialis* teleuto [*Puccinia peckiana* Howe] on *Rubus occidentalis* and *R. villosus*), *see* *Gymnoconia interstitialis* (*Caeoma nitens* Schw.) from *Rubus occidentalis* and *R. villosus*. [Clinton]

RUELLIA strepens (aecidia, uredo and teleuto on *Ruellia strepens*), *see* *Puccinia lateripes* B. & Rav. teleutospores from *Ruellia strepens*. [Kellerman]

RUELLIA strepens (aecidia, uredo and teleuto), *see* *Puccinia lateripes* B. & Rav. teleutospores from *Ruellia strepens*. [Kellerman]

RUELLIA strepens (uredo and teleuto on *Ruellia strepens*), *see* *Puccinia lateripes* B. & Rav. aecidiospores from *Ruellia strepens*. [Kellerman]

RUELLIA strepens (uredo and teleuto), *see* *Puccinia lateripes* B. & Rav. aecidiospores from *Ruellia strepens*. [Kellerman]

RUMEX altissimus (aecidia [*Aecidium rubellum* Pers.]), *see* *Puccinia phragmitis* (Schum.) Körn. from *Phragmitis phragmitis*. [Bates]

RUMEX crispus (*Aecidium rubellum* Pers.), *see* *Puccinia phragmites* (Schum.) Körn. from *Phragmites communis*. [Arthur]

RUMEX obtusifolius (*Aecidium rubellum* Pers.), *see* *Puccinia phragmitis* (Schum.) Körn. from *Phragmites communis*. [Arthur]

RYE, *see* *Secalis cereale*.

SALVIA lanceolata Willd. (*Puccinia caulincola* Tr. & Gall. aecidia [Aecidium caulinolum Kellerm.]). [Kellerman]

SALVIA lanceolata Willd. (*Puccinia caulincola* Tr. & Gall. aecidia [Aecidium caulinolum Kellerm.] on *Salvia lanceolata* Willd.), see *Puccinia caulincola* Tr. & Gall. from *Salvia lanceolata* Willd. [Kellerman]

SALVIA lanceolata Willd. (spermogonia and aecidia), see *Puccinia caulincola* Tr. & Gall. teleutospores from *Salvia lanceolata*. [Arthur]

SALVIA lanceolata Willd. (spermogonia and aecidia on *Salvia lanceolata*), see *Puccinia caulincola* Tr. & Gall. teleutospores from *Salvia lanceolata*. [Arthur]

SAMBUCUS canadensis (Aecidium sambuci Schw.), see *Puccinia atkinsoniana* Diet. from *Carex lurida*. [Kellerman]

SAMBUCUS canadensis (Aecidium sambuci Schw.?), see *Puccinia bolleyana* Sacc. from *Carex trichocarpa*. [Arthur]

SAMBUCUS canadensis (Aecidium sambuci Schw.), see *Puccinia bolleyana* Sacc. from *Carex trichocarpa*. [Kellerman]

SAMBUCUS canadensis (*Puccinia bolleyana* Sacc. uredo on *Carex trichocarpa*), see *Puccinia bolleyana* Sacc. aecidiospores (Aecidium sambuci Schw.?) from *Sambucus canadensis*. [Stuart]

SAMBUCUS canadensis (*Puccinia sambuci* (Schw.) Arth. aecidia [Aecidium sambuci (Schw.) Arth. (P. atkinsoniana Diet.)] from *Carex lurida* Wahl. [Arthur]

SAMBUCUS canadensis (*Puccinia sambuci* (Schw.) Arth. [P. bolleyana Sacc.] uredo on *Carex trichocarpa*), see *Puccinia sambuci* (Schw.) Arth. aecidiospores (Aecidium sambuci Schw.) from *Sambucus canadensis*. [Arthur]

SAMBUCUS canadensis (*Puccinia sambuci* (Schw.) Arth. aecidia [Aecidium sambuci Schw.]), see *Puccinia sambuci* (Schw.) Arth. (P. bolleyana Sacc.) from *Carex trichocarpa* Muhl. [Arthur]

SCIRPUS atrovirens (Aecidium lycopi Ger. on *Lycopus americanus*), see *Puccinia angustata* Pk. from *Scirpus atrovirens*. [Arthur]

SCIRPUS atrovirens Muhl. (*Puccinia angustata* Pk. aecidia [Aecidium lycopi Ger.] on *Lycopus americanus* Muhl.), see *Puccinia angustata* Pk. from *Scirpus atrovirens*. [Kellerman]

SCIRPUS atrovirens (*Puccinia angustata* Pk. uredo), see *Puccinia angustata* Pk. aecidiospores [Aecidium lycopi Ger.] from *Lycopus americanus*. [Arthur]

SECALIS cereale (*Puccinia rubigo-vera secalis* on *Secalis cereale*),
see Puccinia rubigo-vera secalis uredospores from *Secalis cereale*. [Carleton]

SECALIS cereale (*Puccinia rubigo-vera secalis*), *see Puccinia rubigo-vera secalis uredospores* from *Secalis cereale*. [Carleton]

SMILAX herbacea L. (*Aecidium smilacis Schw.*), *see Puccinia amphigena Diet.* from *Calamovilfa longifolia* (Hook.) Hack. [Arthur]

SMILAX hispida Muhl. (*Aecidium smilacis Schw.*), *see Puccinia amphigena Diet.* from *Calamovilfa longifolia* (Hook.) Hack. [Arthur]

SMILAX hispida Muhl. (*spermogonia and aecidia*), *see Puccinia amphigena Diet.* teleutospores from *Calamovilfa longifolia* (Hook.) Hack. [Arthur]

SOLIDAGO caesia L. (*spermogonia*) (*Aecidium solidaginis Schw.*), *see Puccinia caricis-solidaginis Arth.* from *Carex jamesii* Schw. [Arthur]

SOLIDAGO caesia L. (*spermogonia and aecidia*), *see Uromyces caricis-solidaginis Arthur* teleutospores from *Carex varia* Muhl. [Arthur]

SOLIDAGO canadensis L. (*Aecidium solidaginis Schw.*), *see Puccinia caricis-solidaginis Arth.* from *Carex jamesii* Schw. [Arthur]

SOLIDAGO canadensis L. (*Aecidium solidaginis Schw.*), *see Puccinia caricis-solidaginis Arthur* from *Carex stipata*. [Arthur]

SOLIDAGO canadensis L. (*Puccinia caricis-solidaginis Arth. aecidia*), *see Puccinia caricis-solidaginis Arth.* from *Carex stipata* Muhl. [Kellerman]

SOLIDAGO canadensis L. (*spermogonia and aecidia*), *see Uromyces caricis-solidaginis Arth.* teleutospores from *Carex varia* Muhl. [Arthur]

SOLIDAGO flexicaulis L. (*spermogonia and aecidia*), *see Uromyces caricis-solidaginis Arth.* teleutospores from *Carex varia* Muhl. [Arthur]

SOLIDAGO rigida L. (*spermogonia*) (*Aecidiur. solidaginis Schw.*), *see Puccinia caricis-solidaginis Arth.* from *Carex jamesii* Schw. [Arthur]

SOLIDAGO serotina Ait. (*Aecidium solidaginis Schw.*), *see Puccinia caricis-solidaginis Arth.* from *Carex jamesii* Schw. [Arthur]

SOLIDAGO serotina (Aecidium solidaginis Schw.), *see* Puccinia caricis-solidaginis Arthur from Carex stipata. [Arthur]

SOLIDAGO serotina Ait. (spermogonia and aecidia), *see* Uromyces solidagini-caricis Arth. teleutospores from Carex varia Muhl. [Arthur]

SOLIDAGO ulmifolia Muhl. (spermogonia) (Aecidium solidaginis Schw.), *see* Puccinia caricis-solidaginis Arth. from Carex jamesii Schw. [Arthur]

SPARTINA cynosuroides (Aecidium fraxini Schw. on Fraxinus viridis), *see* Puccinia peridermiospora (E. & T. Arth. from Spartina cynosuroides. [Arthur]

SPIRAEA lobata, *see* Ulmaria rubra.

SPOROBOLUS longifolius (Torr.) Wood (Puccinia vilfae A. & H. aecidia [Aecidium verbenicola K. & S.] on Verbena stricta Vent. and V. urticifolia L.), *see* Puccinia vilfae A. & H. [P. verbenicola (K. & S.) Arth.] from Sporobolus longifolius (Torr.) Wood. [Arthur]

SPOROBOLUS longifolius (Puccinia vilfae A. & H. uredo), *see* Puccinia vilfae A. & H. aecidiospores (Aecidium verbenicola K. & S.), from Verbena stricta. [Arthur]

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STROPHOSTYLES helvola (L.) Britt. (Phaseolus diversifolius Pers. (spermogonia and aecidia on Strophostyles helvola), *see* Uromyces phaseoli (Pers.) Wint. teleutospores from Strophostyles helvola (L.) Britt. [Arthur]

STROPHOSTYLES helvola (L.) Britt. (spermogonia and aecidia), *see* Uromyces phaseoli (Pers.) Wint. teleutospores from Strophostyles helvola (L.) Britt. [Arthur]

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TRICUSPIS seslerioides (Aecidium pteleae on *Ptelea trifoliata*),
see Puccinia windsoriae Schw. from *Tricuspis seslerioides*.
 [Kellerman]

TRICUSPIS seslerioides Torr. (*Triodia cuprea* Jacq.) (*Puccinia windsoriae* Schw. aecidia [Aecidium pteleae B. & C.?] on *Ptelea trifoliata* L., *see Puccinia windsoriae* Schw. from *Tricuspis seslerioides* Torr. (*Triodia cuprea* Jacq.) [Arthur]

TRIFOLIUM pratense and *T. repens* uredo (*Uromyces trifolii* (A. & S.) Wint.), *see Uromyces trifolii* (A. & S. aecidiospores from *Trifolium pratense* and *T. repens*). [Howell]

TRIFOLIUM pratense and *T. repens* (*Uromyces trifolii* (A. & S.) Wint. uredo on *Trifolium pratense* and *T. repens*), *see Uromyces trifolii* (A. & S.) Wint. aecidiospores from *Trifolium pratense* and *T. repens*. [Howell]

TRIFOLIUM pratense and *T. repens* (*Uromyces trifolii* (A. & S.) Wint. uredo on *Trifolium pratense* and *T. repens*), *see Uromyces trifolii* (A. & S.) Wint. uredospores from *Trifolium pratense* and *T. repens*. [Howell]

TRIFOLIUM pratense and *T. repens* (*Uromyces trifolii* (A. & S.) Wint. uredo), *see Uromyces trifolii* (A. & S.) Wint. uredospores from *Trifolium pratense* and *T. repens*. [Howell]

TRIFOLIUM repens, *see Trifolium pratense* and *T. repens*. [Howell]

TRIODIA cuprea (*Sieblingia seslerioides* Sc) (*Puccinia windsoriae* Schw. uredo), *see Puccinia windsoriae* Schw. aecidiospores (Aecidium pteleae B. & C.) from *Ptelea trifoliata*. [Arthur]

TRIPHAGMIUM ulmariae (Schum.) Lk. aecidiospores (*Caeoma ulmariae* Thüm.) from *Ulmaria rubra* (*Spiraea lobata*) (*Triphragmium ulmariae* (Schum.) Lk. uredo and teleuto on *Ulmaria rubra*). J. C. Arthur. Bot. Gaz. 29:272. April 1900.

TRIPHAGMIUM ulmariae (Schum.) Lk. uredo and teleuto on *Ulmaria rubra*, *see Triphragmium ulmariae* (Schum.) Lk. aecidiospores (*Caeoma ulmariae* Thüm. from *Ulmaria rubra* (*Spiraea lobata*)). [Arthur]

TRIPHAGMIUM ulmariae (Schum.) Lk. uredospores from *Ulmaria rubra* (*Spiraea lobata*) (*Triphragmium ulmariae* (Schum.) Lk. uredo on *Ulmaria rubra*). J. C. Arthur. Bot. Gaz. 29:272. April 1900.

TRIPHAGMIUM ulmariae (Schum.) Lk. uredo on *Ulmaria rubra*, *see Triphragmium ulmariae* (Schum.) Lk. uredospores from *Ulmaria rubra* (*Spiraea lobata*). [Arthur]

TRITICUM monococcum (*Puccinia graminis tritici*), *see* *Puccinia graminis tritici* uredospores from *Triticum vulgare*. [Carleton]

TRITICUM vulgare (*Puccinia graminis* on *Avena sativa*), *see* *Puccinia graminis* uredospores from *Triticum vulgare*. [Hitchcock & Carleton]

TRITICUM vulgare (*Puccinia graminis* on *Hordeum distichum*), *see* *Puccinia graminis* uredospores from *Triticum vulgare*. [Hitchcock & Carleton]

TRITICUM vulgare (*Puccinia graminis*), *see* *Puccinia graminis* uredospores from *Triticum vulgare*. [Hitchcock & Carleton]

TRITICUM vulgare (*Puccinia graminis* on *Triticum vulgare*), *see* *Puccinia graminis* uredospores from *Triticum vulgare*. [Hitchcock & Carleton]

TRITICUM vulgare (*Puccinia graminis tritici*), *see* *Puccinia graminis tritici* uredospores from *Elymus canadensis glaucifolius*. [Carleton]

TRITICUM vulgare (*Puccinia graminis tritici*), *see* *Puccinia graminis tritici* uredospores from *Hordeum jubatum*. [Carleton]

TRITICUM vulgare (*Puccinia graminis tritici*), *see* *Puccinia graminis tritici* uredospores from *Triticum vulgare*. [Carleton]

TRITICUM vulgare (*Puccinia graminis tritici* on *Triticum vulgare*, *Festuca gigantea*, *Agropyron richardsoni*, *Triticum monococcum*, *Hordeum* [*distichum*], *Koeleria cristata*), *see* *Puccinia graminis tritici* uredospores from *Triticum vulgare*. [Carleton]

TRITICUM vulgare Vill. (*Uredo rubigo-vera* DC. on *Triticum vulgare*), *see* *Uredo-rubigo-vera* DC. from *Triticum vulgare* Vill. [Arthur]

TRITICUM vulgare (*Uredo rubigo-vera* DC.), *see* *Uredo rubigo-vera* DC. from *Triticum vulgare* Vill. [Arthur]

TRITICUM vulgare (*Puccinia rubigo-vera* on *Triticum vulgare*), *see* *Puccinia rubigo-vera* uredospores from *Triticum vulgare*. [Hitchcock & Carleton]

TRITICUM vulgare (*Puccinia rubigo-vera tritici*), *see* *Puccinia rubigo-vera tritici* uredospores from *Triticum vulgare*. [Carleton]

TRITICUM vulgare (*Puccinia rubigo-vera tritici* on *Triticum vulgare*), *see* *Puccinia rubigo-vera tritici* uredospores from *Triticum vulgare*. [Carleton]

ULMARIA rubra (*Triphragmium ulmariae* (Schum.) Lk. uredo and teleuto), *see* *Triphragmium ulmariae* (Schum.) Lk. aecidiospores [*Caeoma ulmariae* Thüm] from *Ulmaria rubra* (*Spiraea lobata*). [Arthur]

ULMARIA rubra [*Spiraea lobata*] (*Triphragmium ulmariae* (Schum.) Lk. uredo on *Ulmaria rubra*), *see* *Triphragmium ulmariae* (Schum.) Lk. uredospores from *Ulmaria rubra* (*Spiraea lobata*). [Arthur]

ULMARIA rubra [*Spiraea lobata*] (*Triphragmium ulmariae* (Schum.) Lk. uredo and teleuto on *Ulmaria rubra*), *see* *Triphragmium ulmariae* (Schum.) Lk. aecidiospores [*Caeoma ulmariae* Thüm.] from *Ulmaria rubra* (*Spiraea lobata*).

ULMARIA rubra [*Spiraea lobata*] (*Triphragmium ulmariae* (Schum.) Lk. uredo, *see* *Triphragmium ulmariae* (Schum.) Lk. uredospores from *Ulmaria rubra* (*Spiraea lobata*)). [Arthur]

UREDО on *Euphorbia nutans*, *see* *Uromyces euphorbiae* C. & P. aecidiospores from *Euphorbia nutans*. [Arthur]

UREDО *rubigo-vera* DC. on *Triticum vulgare*, *see* *Uredo rubigo-vera* DC. from *Triticum vulgare* Vill. [Arthur]

UREDО *rubigo-vera* DC. from *Triticum vulgare* Vill. (*Uredo rubigo-vera* DC. on *Triticum vulgare*). J. C. Arthur. Bot. Gaz. 35:13. Jan. 1903.

UROMYCES aristidae E. & E. from *Aristida oligantha* Mx. (Aecidium *plantaginis* Ces. (?) on *Plantago rugelii*). J. C. Arthur. Bot. Gaz. 35:17. Jan. 1903.

UROMYCES euphorbiae C. & P. aecidiospores from *Euphorbia humistrata* Engl. (*Uromyces euphorbiae* C. & P. uredo on *Euphorbia humistrata* Engl.). J. C. Arthur. Bot. Gaz. 35:12. Jan. 1903.

UROMYCES euphorbiae C. & P. aecidiospores (Aecidium *euphorbiae* Am. Auct.) from *Euphorbia nutans* (*Uromyces euphorbiae* C. & P. uredo and teleuto on *Euphorbia nutans*). J. C. Arthur. Bot. Gaz. 32:270. April 1900.

UROMYCES euphorbiae C. & P. aecidiospores from *Euphorbia nutans* (*Uredo* on *Euphorbia nutans*). J. C. Arthur. Jour. Mycol. 8:52. June 1902.

UROMYCES euphorbiae C. & P. aecidiospores from *Euphorbia nutans* Lag. (*Uromyces euphorbiae* C. & P. uredo on *Euphorbia nutans* Lag.) J. C. Arthur. Bot. Gaz. 35:12. Jan. 1903.

UROMYCES euphorbiae C. & P. uredo on *Euphorbia dentata* Mx., *see* *Uromyces euphorbiae* C. & P. uredospores from *Euphorbia dentata* Mx. [Arthur]

UROMYCES euphorbiae C. & P. uredospores from Euphorbia dentata Mx. (*Uromyces euphorbiae* C. & P. uredo on *Euphorbia dentata* Mx.). J. C. Arthur. Bot. Gaz. 35:13. Jan. 1903.

UROMYCES euphorbiae C. & P. uredo on *Euphorbia humistrata* Engl., *see* *Uromyces euphorbiae* C. & P. aecidiospores from *Euphorbia humistrata* Engl. [Arthur]

UROMYCES euphorbiae C. & P. uredo on *Euphorbia nutans* Lag., *see* *Uromyces euphorbiae* C. & P. aecidiospores from *Euphorbia nutans* Lag. [Arthur]

UROMYCES euphorbiae C. & P. uredo and teleuto on *Euphorbia nutans*, *see* *Uromyces euphorbiae* (Aecidium *euphorbiae* Am. Auct. from *Euphorbia nutans*). [Arthur]

UROMYCES lespedezae-procumbentis (Schw.) Curt. teleutospores from *Lespedeza capitata* Mx. (spermogonia and aecidia [Aecidium *leucospermum* B. & C.] on *Lespedeza capitata*). J. C. Arthur. Jour. Mycol. 10:14. Jan. 1904.

UROMYCES phaseoli (Pers.) Wint. teleutospores from *Strophostyles helvola* (L.) Britt. (*Phaseolus diversifolius* Pers.) (spermogonia and aecidia on *Strophostyles helvola*). J. C. Arthur. Jour. Mycol. 10:14. an. 1904.

UROMYCES solidagini-caricis Arth. n. n. teleutospores from *Carex varia* Muhl. (spermogonia and aecidia on *Solidago canadensis* L., *S. serotina* Ait., *S. flexicaulis* L., *S. caesia* L.) J. C. Arthur. Jour. Mycol. 10:16. Jan. 1904.

UROMYCES trifolii (A. & S.) Wint. uredo on *Trifolium pratense* and *T. repens*, *see* *Uromyces trifolii* (A. & S.) Wint. aecidiospores from *Trifolium pratense* and *T. repens*. [Howell]

UROMYCES trifolii (A. & S.) Wint. uredo on *Trifolium pratense* and *T. repens*, *see* *Uromyces trifolii* (A. & S.) Wint. uredospores from *Trifolium pratense* and *T. repens*. [Howell]

UROMYCES trifolii (A. & S.) Wint. aecidiospores from *Trifolium pratense* and *T. repens* (*Uromyces trifolii* (A. & S.) Wint. uredo on *Trifolium pratense* and *T. repens*). J. K. Howell. Cornell Univ. Agr. Exp. Sta. Bull. 24:137. Dec. 1890.

UROMYCES trifolii (A. & S.) Wint. uredospores from *Trifolium pratense* and *T. repens* (*Uromyces trifolii* (A. & S.) Wint. uredo on *Trifolium pratense* and *T. repens*). J. K. Howell. Cornell Univ. Agr. Exp. Sta. Bull. 24:135. Dec. 1890.

URTICA sp. (*Puccinia caricis* (Schum.) Reb. uredo on *Carex stricta*), *see* *Puccinia caricis* (Schum.) Reb. aecidiospores [Aecidium *urticae* Schum.] from [Urtica sp.] [Arthur]

URTICA gracilis (Aecidium urticae Schum.), see *Puccinia caricis* (Schum.) Reb. from *Carex riparia*. [Kellerman]

URTICA gracilis (Aecidium urticae), see *Puccinia caricis* (Schum.) Reb. from *Carex stricta*. [Arthur]

URTICA gracilis (Aecidium urticae Schw.), see *Puccinia caricis* (Schum.) Reb. from *Carex stricta*. [Kellerman]

URTICA gracilis (*Puccinia caricis* (Schum.) Reb. aecidia), see *Puccinia caricis* (Schum.) Reb. from *Carex stricta* Lam. [Arthur]

VERBENA stricta Vent. (*Puccinia vilfae* A. & H. aecidia [Aecidium verbenicola K. & S.]), see *Puccinia vilfae* A. & H. [*P. verbenicola* (K. & S.) Arth. n. n.] from *Sporobolus longifolius* (Torr.) Wood. [Arthur]

VERBENA stricta (*Puccinia vilfae* A. & H. uredo on *Sporobolus longifolius*), see *Puccinia vilfae* A. & H. aecidiospores (Aecidium verbenicola K. & S.) from *Verbena stricta*. [Arthur]

VERBENA urticifolia L. (*Puccinia vilfae* A. & H. aecidia (Aecidium verbenicola K. & S.)), see *Puccinia vilfae* A. & H. [*P. verbenicola* (K. & S.) Arth.] from *Sporobolus longifolius* (Torr.) Wood. [Arthur]

WASHINGTONIA claytoni (*Puccinia osmorrhizae teleuto* [?]), see *Aecidium osmorrhizae* Pk. from *Washingtonia claytoni*. [Kellerman]

WASHINGTONIA claytoni (*Osmorrhiza brevistylis*) [*Puccinia osmorrhizae teleuto*] on *Chaerophyllum procumbens* and (?) on *Washingtonia claytoni*, see *Aecidium osmorrhizae* Pk. from *Washingtonia claytoni*. [Kellerman]

Wheat, see *Triticum vulgare*.

SUMMARY OF ALTERNATE FORMS.

Aecidium albiperidia Arth.—*Puccinia albiperidia* Arth.

Aecidium asteratum Schw.—*Puccinia caricis-asteris* Arth.

Aecidium berberidis Pers.—*Puccinia poculiformis* (Jacq.) Wetst.

Aecidium calystegiae Desm.—*Puccinia convolvuli* Cast.

Aecidium caulinolum Kellerm.—*Puccinia caulincola* Tr. & Gall.

Aecidium cirsii-lanceolati Schroet.—*Aecidium cirsii-lanceolati* Kellerm.

Aecidium ellisii Tr. & Gall.—*Puccinia subnitens* Diet.

Aecidium erigeronatum Schw.—*Puccinia caricis-erigerontis* Arth.

Aecidium euphorbiae Am. Auct.—*Uromyces euphorbiae* C. & P.

Aecidium fraxini Schw.—*Puccinia fraxinata* (Lk.) Arth.

Aecidium on *Helianthus*—*Puccinia helianthi* Schw.

Aecidium hibisciatum Schw.—*Puccinia hibisciata* (Schw.) Kellerm. (*P. muhlenbergiae* Arth. & Holw.)

Aecidium hymoideum B. & C.—*Puccinia hydnoidea* (B. & C.) Arth.

Aecidium impatientis Schw.—*Puccinia impatientis* (Schw.) Arth. (*P. rubigo-vera* Auct. on *Elymus virginicus*)

Aecidium jamesianum Pk.—*Puccinia jamesiana* (Pk.) Arth. (*P. bartholomaei* Diet.)

Aecidium on *Larix decidua*, *see* *Caeoma* on *Larix decidua*.

Aecidium lateripes Kellerm.—*Puccinia lateripes* B. & Rav.

Aecidium leucospermum B. & C.—*Uromyces lespedezae-procumbentis* (Schw.) Curt.

Aecidium lycopi Ger.—*Puccinia angustata* Pk.

Aecidium oenotherae Pk., *see* *Aecidium peckii* DeToni.

Aecidium pammelii Trel.—*Puccinia panici* Diet.

Aecidium peckii DeToni, (*Ae. oenotherae* Pk.)—*Puccinia peckii* (DeToni) Kellerm. (*P. caricis* Auct. p. p.)

Aecidium pentstemonis Schw.—*Puccinia andropogonis* Schw.

Aecidium plantaginis Ces. (?) on *Plantago rugelii* Dec.—*Uromyces aristidae* E. & E.

Aecidium pteleae B. & C.—*Puccinia windsoriae* Schw.

Aecidium pustulatum Curt.—*Puccinia pustulata* (Curt.) Arth.

Aecidium [ranunculacearum (?)] on *Anemone canadensis* L.—*Puccinia simillima* Arth.

Aecidium ranunculi Schw.—*Puccinia eatoniae* Arth.

Aecidium rhamni Pers.—*Puccinia rhamni* (Pers.) Wettst. (*P. coronata* Corda.)

Aecidium rubellum Pers.—*Puccinia phragmitis* Schum.

Aecidium sambuci Schw.—*Puccinia sambuci* (Schw.) Arth. (*P. atkinsoniana* Diet., *P. bolleyana* Sacc.)

Aecidium smilacis Schw.—*Puccinia amphigena* Diet.

Aecidium solidaginis Schw.—*Puccinia caricis-solidaginis* Arth.

Aecidium on *Solidago*—*Uromyces solidagini-caricis* Arth.

Aecidium on *Strophostyles helvola*—*Uromyces phaseoli* (Pers.) Wint.

Aecidium on *Trifolium*, *see* *Uromyces trifolii* (A. & S.) Wint.

Aecidium *urticae* Schum.—*Puccinia caricis* (Schum.) Reb.

Aecidium *verbenicola* K. & S.—*Puccinia vilfae* A. & H.

Caeoma (Aecidium) *erigeronatum* Schw., *see* Aecidium *erigeronatum* Schw.

Caeoma (Aecidium) *hibisciatum* Schw., *see* *Puccinia hibisciata* Schw.) Kellerm.

Caeoma on *Larix decidua*—*Melampsora medusae* Thüm. [M. *populina* Am. Auct.]

Caeoma *miniata* Am. Auct.—*Phragmidium speciosum* Fr.

Caeoma *nitens* Schw., *see* *Gymnoconia interstitialis* (Schlecht.) Lagh.

Caeoma *ulmariae* Thüm.—*Triphragmium ulmariae* (Schum.) Lk.

Gymnoconia interstitialis (Schlecht.) Lagh., aecidium (Caeoma *nitens* Schw.), and teleuto (*Puccinia peckinana* Howe); autoecious.

Gymnosporangium *biseptatum* Ell.—*Roestelia botryapites* Schw.

Gymnosporangium *clavariaeforme* (Jacq.) Rees.—*Roestelia lacerata* (Sow.) Fr.

Gymnosporangium *clavipes* Cke. & Pk.—*Roestelia aurantiaca* Peck.

Gymnosporangium *conicum* Rees.—*Roestelia cornuta* (Ehr.) Fr.

Gymnosporangium *ellisii* (Berk.) Farl.—*Roestelia transformans* Ellis (?)

Gymnosporangium *globosum* Farl.—*Roestelia globosum* ("lacerata z") Thaxter.

Gymnosporangium *macropus* Lk.—*Roestelia pyrata* Thaxter.

Gymnosporangium *nidus-avis* Thaxter—*Roestelia nidus-avis* Thaxter.

Melampsora medusae Thüm [M. *populina* Am Auct.]—Caeoma on *Larix decidua*.

Melampsora populina Am. Auct., *see* *Melampsora medusae* Thüm.

Phragmidium speciosum Fr.—Caeoma *miniata* Am. Auct.

Puccinia albiperidia Arth., aecidium [*aibiperidium* Arth.] uredo and teleuto; autoecious.

Puccinia americana Lagh., *see* Puccinia andropogonis Schw.
Puccinia amphigena Diet.—Aecidium smilacis Schw.
Puccinia andropogonis Schw. (*P. americana* Lagh.)—Aecidium pentstemonis Schw.
Puccinia angustata Pk.—Aecidium lycopi Ger.
Puccinia atkinsoniana Diet., *see* Puccinia sambuci (Schw.) Arth.
Puccinia bartholomaei Diet., *see* Puccinia jamesiana (Pk.) Arth.
Puccinia bolleyana Sacc., *see* Puccinia sambuci (Schw.) Arth.
Puccinia caricis (Schum.) Reb.—Aecidium urticae Schum.
Puccinia caricis Am Auct. p. p. (*P. peckii* [DeToni] Kellerm.),
see *P. peckii* (DeToni) Kellerm.
Puccinia caricis-asteris Arth.—Aecidium asteratum Schw.
Puccinia caricis-erigerontis Arth.—Aecidium erigeronatum Schw.
Puccinia caricis-solidaginis Arth.—Aecidium solidaginis Schw.
Puccinia caulincola Tr. & Gall., aecidium [*caulinolum* Kellerm.],
uredo and teleuto; autoecious.
Puccinia cirsii-lanceolati Schroet., aecidium [*cirsii-lanceolati* Kel-
lerm.] uredo and teleuto; autoecious.
Puccinia convolvuli Cast., aecidium [*calystegiae* Desm.] uredo
and teleuto; autoecious.
Puccinia coronata Corda, *see* Puccinia rhamni (Pers.) Wettst.
Puccinia eatoniae Arth.—Aecidium ranunculi Schw.
Puccinia fraxinata (Lk.) Arth.—Aecidium fraxini Schw.
Puccinia graminis, *see* Puccinia poculiformis (Jacq.) Wettst.
Puccinia helianthi Schw., aecidium [*Caeoma helianthi* Schw.],
uredo and teleuto; autoecious.
Puccinia hibisciata (Schw.) Kellerm. (*P. muhlenbergiae* Arth.
& Hol.)—Aecidium hibisciatum Schw.
Puccinia hydnoidea (B. & C.) Arth.—Aecidium hydnoideum B.
& C.
Puccinia impatientis (Schw.) Arth. (*P. rubigo-vera* Auct. on
Elymus virginicus)—Aecidium impatientis Schw.
Puccinia jamesiana (Pk.) Arth. (*P. bartholomaei* Diet.)—Aecid-
ium jamesianum Pk.
Puccinia lateripes B. & Rav., aecidium [*lateripes* Kellerm.] uredo
and teleutospores; autoecious.
Puccinia muhlenbergiae Arth. & Hol., *see* Puccinia hibisciata
(Schw.) Kellerm.

Puccinia panici Diet.—*Aecidium pammelii* Trel.

Puccinia peckiana Howe, *see* *Gymnoconia interstitialis* (Schlecht.) Lagh.

Puccinia peckii (DeToni) Kellerm. (*P. caricis* Am. Auct. p. p.)—*Aecidium peckii* DeToni (*Ae. oenotherae* Pk.).

Puccinia peridermiospora (E. & T.) Arth., *see* *Puccinia fraxinata* (Lk.) Arth.

Puccinia phragmitis (Schum.) Körn.—*Aecidium rubellum* Pers.

Puccinia poculiformis (Jacq.) Wettst.—*Aecidium berberidis* Pers.

Puccinia pustulata (Curt.) Arth.—*Aecidium pustulatum* Curt.

Puccinia rhamni (Pers.) Wettst. (*P. coronata* Corda)—*Aecidium rhamni* Pers.

Puccinia rubigo-vera Am. Auct, on *Elymus virginicus*, *see* *Puccinia impatiens* (Schw.) Arth.

Puccinia sambuci (Schw.) Arth. (*P. atkinsoniana* Diet., *P. bolleyana* Sacc.)—*Aecidium sambuci* (Schw.) Arth.

Puccinia simillima Arth.—*Aecidium ranunculacearum* (?) on *Anemone canadensis* L.

Puccinia subnitens Diet.—*Aecidium ellisii* Tr. & Gall.

Puccinia vilfae A. & H.—*Aecidium verbenicola* K. & S.

Puccinia windsoriae Schw.—*Aecidium pteleae* B. & C.

Roestelia aurantiaca Pk.—*Gymnosporangium clavipes* Cke. & Pk.

Roestelia botryapites Schw.—*Gymnosporangium biseptatum* Ell.

Roestelia cornuta (Ehr.) Fr.—*Gymnosporangium concium* Rees.

Roestelia globosum ("lacerata z") Thaxter—*Gymnosporangium globosum* Farl.

Roestelia lacerata (Sow.) Fr.—*Gymnosporangium clavariae-forme* (Jacq.) Rees.

Roestelia "lacerata z," *see* *Roestelia globosum*.

Roestelia nidus-avis Thax.—*Gymnosporangium nidus-avis* Thax.

Roestelia pyrata Thaxter—*Gymnosporangium macropus* Lk.

Roestelia transformans Ell. (?) —*Gymnosporangium ellisii* (Berk.) Farl.

Triphragmium ulmariae (Schum.) Lk.—*Caeoma ulmariae* Thüm.

Uromyces aristidae E. & E.—*Aecidium plantaginis* Ces. (?) on *Plantago rugelli* Dec.

Uromyces solidagini-caricis Arth.—*Aecidium* on *Solidago*.

Uromyces euphorbiae C. & P.—Aecidium euphorbiae Am. Auct.
Uromyces lespedezae-procumbentis (Schw.) Curt., aecidium
[leucospermum B. & C.], uredo and teleuto; autoecious.
Uromyces phaseoli (Pers.) Wint., aecidium, uredo and teleuto;
autoecious.
Uromyces trifolii (A. & S.) Wint. aecidium, uredo and teleuto;
autoecious.

NOTES FROM MYCOLOGICAL LITERATURE. IX.

W. A. KELLERMAN.

THE FIRST PART OF A KEY TO THE NORTH AMERICAN SPECIES OF INOCYBE—Sections Squarrosae and Lacerae,—is given by F. S. Earle in *Torreya*, 3:168-170, Nov. 1903.

THE FORM AND STRUCTURE OF THE MYCODOMATIA of *Myrica cerifera* L., is published in the Proceedings of the Academy of Natural Sciences of Philadelphia, 55:352-362, Pl. XVI-XVII, 1903, by John W. Harshberger. This is a new host for *Frankia brunchorstii* Möller; the author describes his investigations and observations, and says it is probable that this species "is more in the nature of an endotrophic mycorrhiza, to be placed intermediate between the ectotrophic mycorrhiza found on the Indian Pipe *Monotropa*, and the typical endotrophic mycorrhiza found in *Thismia* and certain other plants, where a definite relationship is established between the nucleus of the host and the fungous hyphae." A chronological Bibliographical Index of 18 items, concludes the article. The hosts on which Mycodomata have been reported to date are: *Alnus glutinosa*, *A. incana*, *A. serrulata*, *A. undulata*, *Elaeagnus*, *Hippophae rhamnoides*, *Shepherdia*, [*Frankia alni* (Möller) Atks.]; *Myrica gale*, *M. cerifera* [F. *brunchorstii* Möller]; *Ceanothus americanus* [F. *ceanothi* Atks.].

NUCLEAR DIVISIONS AND NUCLEAR FUSION IN COLEOSPORIUM SONCHI-ARVENSIS Lév., R. J. Holden and R. A. Harper, Trans. Wisc. Acad. Sci. Arts and Let. 14:63-82, Pl. I, II, Sept. 1903 (separate), outlines the study of the nuclear phenomena in the rusts by previous investigators, and details important investigations by the authors which agree in general with previous results. In regard to the life history of the Coleosporium the authors say: "From the teleutospore to the sporidium we find uni-nucleated cells; from the sporidium to the teleutospore we have bi-nucleated cells. . . . There is as yet no evidence of any proper cell fusion in the rusts though the fusion of the nuclei in the teleutospore has the essential characteristics of a sexual fertilization in the origin of the nucli and in the behavior of the teleutospore after fusion as described above. . . . Sexual reproduction in the

rusts may possibly dispense with cell fusion, while retaining the more essential feature of the union of nuclei more or less widely separated in origin."

THE ARTICLES IN THE REVUE MYCOLOGIQUE, October 1903, besides the reviews are as follows: Mycorrhizes des arbres forestiers et sur le sens de la Symbiose des Racines, Georg F. L. Sarauw; L'Amanita mappa Fries estelle à ranger parmi les espèces très vénéneuses? R. Ferry et H. Schmidt.

IN REVISTA AGRONOMICA, DEZEMBRO DE 1903, J. VERRISSIMO d'ALMEIDA ET M. DE SOUZA DA CAMARA, publish contributions ad Mycofloram Lusitaniae, Centuria III. Four species are listed, and a new genus is proposed, namely, COUTINIA, Sphaeriaceae, a familia Dothideacearum praecipue differt stromate nullo. They also make correction of previous publication as follows: Puccinia maculicola n. sp. in *Urginea Scilla* est P. Asphodeli Duby, in Asphodeli sp.

ISLANDS SVAMPE AF E. ROSTRUP published in Botanisk Tidskrift, 25:281-335, 1903, contains a list of 543 fungi. The author describes 22 new species: the diagnoses are in the latin language.

IN THE ANNALS OF BOTANY (17:167-236, Pl. XII-XIII, JAN. 1903) is published an extended article by T. P. Barker, on The Morphology and Development of the Ascocarp in Monascus. "These considerations point to the view that Monascus represents a low and comparatively simple type of Ascomycete and is not far removed from a common ancestral type, from which all the higher Ascomyces may be supposed to have sprung."

ALBERT HOWARD, WHOSE INVESTIGATION ON SOME DISEASES OF THE SUGAR-CANE IN THE WEST INDIES is published in the Annals of Botany, 17:373-411, Pl. XVIII, March 1903, concludes that *Thielaviopsis ethaceticus* Went. (and not *Melanconium sacchari* Massee) causes a disease of cane-cuttings which is the same as the "pine apple" disease in Java; the 'rind' disease is caused by *Colletotrichum falcatum* Went.; the common root disease of the sugar-cane in Barbados is caused by *Marasmius sacchari* Wakker.

MISS E. DALE CONTRIBUTES AN INTERESTING AND IMPORTANT ARTICLE, OBSERVATIONS ON GYMNOASCACEAE, Annals of Botany, 17:571-596, Pl. XXVII-XXVIII, June 1903. The investigations "leave no doubt as to the occurrence of a sexual process in the Gymnoascaceae, if not in every species, at least in *Gymnoascus reesii* and in *G. candidus*. Such a process has not before been described, though it was assumed."

TWO FUNGI, PARASITIC ON SPECIES OF TOLYPOTHRIX (Resicularia nodosa Dang. and R. boodelei n. sp.) by F. E. Fritsch (Annals of Botany, 17:649-664, Pl. XXIX, Sept. 1903) is an

important contribution to the knowledge of Fungi affecting algal hosts — nearly two hundred species now being known.

N. PATOUILLARD IN A NOTE SUR LE GENRE PAUROCOTYLIS BERK., Bull. Soc. Myc. France, 19:339-341, 31 Dec. 1903, publishes his study of *Paurocotylis pila* of New Zealand and *P. fulva* of Ceylon and concludes as follows: En résumé, l'aurocotylis est un groupe d'Ascomycètes formé d'éléments hétérogènes, duquel on devra retirer toutes les espèces que ne répondent pas au type du *P. pila*.

SUR L'IDENTITE REELLE DU SPHAEROPSIS MALORUM Peck, by G. Delacroix, Bull. Soc. Myc. France, 19:350-2, 31 Dec. 1903, refers to a previous publication by the same author, then states that he has had an abundance of material for study collected in various countries. He says *Sphaeropsis malorum* is different from both *Diplodia maura* C. & Ell. and *Botryodiplodia mali* P. Braunaud; Enfin le *Sphaeropsis malorum* Peck est absolument identique à *Diplodia pseudo-diplodia* Fuck. Je considere, d'un autre côté, que le *Macrophoma malorum* (Berk.) Berl. et Vogl. n'est autre que le stade jeune du *Sphaeropsis*.

THE ARTICLES IN THE BULLETIN DE LA SOCIETE MYCOLOGIQUE DE FRANCE, tome XIX, 4e Fascicule are as follows: Patouillard, Sur le genre *Paurocotylis* Berk.; Rolland, Note sur l'*Inocybe repanda* Bull. et l'*Inocybe hiulca* Fries; Delacroix, [Travaux Stat. Path. Veg.] Sur le "blanc" des feuilles de Mûries de Madagascar produit par *Ovulariopsis moricola* nov. sp. G. Del., A propos de *Stromatinia linhartiana* Prill. et Del. (*Sclerotinia cydoniae* Schellenberg), Sur l'identité réelle du *Sphaeropsis Malorum* Peck, Sur le parasitisme du *Dothichiza populea* Sacc. et Briard sur diverses espèces de Peupliers, Sur la pourriture des Pommes des terre; Empoisonnement par l'*Amanita muscaria*, par un Pleurote et une Clavaire.

MONOGRAPHIA UREDINEARUM, P. ET H. SYDOW, VOLUMEN I, FASCICULUS IV, appeared 1 November 1903. It includes pp. 593-768 and the serial numbers are 880 to 1094 inclusive. The species of *Puccinia* enumerated are those on the hosts belonging to Orchidaceae, Marantaceae, Cannaceae, Zingiberaceae, Iridaceae, Amaryllidaceae, Haemoraceae, Liliaceae, Bromeliaceae, Juncaceae, Cyperaceae, and Graminaceae. It might be noted that the authors do not adhere to strict priority in the use of names of polymorphic species. Thus they do not follow Arthur's name of *Puccinia sambuci* (*Aecidium sambuci* 1834, *P. atkinsoniana* 1897, and *P. bolleyana* 1889) but retain *Puccinia bolleyana* with the others as synonyms; again, *Puccinia hibisciata* (Sch.) Kellerm. (*Aecidium hibisciatum* Schw. 1834, *Puccinia muhlenbergiae* Arth. & Holw. 1902) is listed as *P. muhlenbergiae* Arth. & Holw. with other names as synonyms.

THE "BLUING" AND THE "RED ROT" OF THE WESTERN YELLOW PINE, with special reference to the Black Hills Forest Reserve, Hermann von Schrenk, a paper of 40 pages and 14 plates, forms Bulletin No. 36 of the Bureau of Plant Industry, issued 5 May 1903. Dr. von Schrenk finds the causes of the two phenomena to be fungi respectively as follows: *Ceratostomella pilfera* (Fr.) Winter, and *Polyporus* [Fomes] *ponderosus* von Schrenk n. sp. Later publication is promised.

R. E. B. MCKENNEY REPORTS IN BULLETIN NO. 51, Bureau of Plant Industry, on the Wilt Disease of Tobacco and its Control, saying microscopic examination of wilted Tobacco always reveals the presence of a fungus belonging to the genus *Fusarium* (*Neocosmospora*). This is found in the woody parts of the roots and stem. The *Fusarium* is a soil fungus and gains entrance to the plants through the fine roots.

OBSERVATIONS ON *PHALLUS RAVENELII*, BY HOWARD J. BANKER, *Torreya*, 4:5-8, Jan. 1904, pertains to an abundance of "eggs" from the size of a mustard seed to that of a walnut; also the mycelium in a pile of sawdust, that protected by a pile of lumber being a tangled network and filled with very irregular tubercular masses one-half to five centimeters in diameter. These tubercles or sclerotia appeared to be enlarged portions of the mycelial threads and were twisted, lobed and convoluted in a very irregular manner. The white color of mycelium and tubercles quickly turned bluish-purple on exposure to air.

IN *BOTANISKA NOTISER FOER AR 1903*, pp. 249-267, G. LAGERHEIM publishes an interesting article, *Zur Kentniss der Bulgaria globosa* (Schmid.) Fr. (*Sarcosoma globosum* et S. *platydiscus* Auct.), giving a history of this species, its occurrence and notes on its development. It was named *Burcardia globosa* by Schmidel in 1755; this name being preoccupied it was changed to *Sarcosoma* by Caspary. The author points out the insufficient grounds for maintaining this genus and says: Meines erachtens ist deshalb die Gattung *Sarcosoma* Casp. einzuziehen oder höchstens als ein subgenus der Gattung *Bulgaria* Fr. zu betrachten. A plate accompanies the article.

THE RESULTS OF THESE EXPERIMENTS PROVE that pear blight may attack apricot twigs and fruit—is the reported result in "An Apricot Blight" by Wendell Paddock, Bulletin 84, Colorado Agricultural Experiment Station, October 1903.

R. H. PETTIT, ENTOMOLOGIST, MICHIGAN AGRICULTURAL EXPERIMENT STATION, reports in Special Bulletin No. 17, a fungous disease of the Musquito—*Entomophthora* sp. nov., and a fungous disease of a scale insect (*Lecanium longulum*), namely, *Isaria lecanifera* Pettit n. sp. "No *Isaria* sporophores were seen but the fungus is placed in the genus *Isaria* because

of its very close affinity to the Isaria stage of *Cordyceps clavulata*."

CLAVARIA MUCIDA PERS. AS GROWING ON ALGA-COVERED WOOD, said by Morgan "usually growing on a thin greenish stratum, *Chlorococcus*", is noted by W. C. Cooker in the Botanical Gazette, 37:62, Jan. 1904. The hyphae do not enter the alga and have no haustoria, but show about the same close relation (says the author) with the alga as in the case of the lichen, *Collema*. He adds: From its constant occurrence and close association with this alga there seems scarcely a doubt that *Clavaria mucida* is in the initial stages of becoming a basidiomycetous lichen.

IN THE BULLETIN OF THE TORREY BOTANICAL CLUB FOR JANUARY 1904, J. C. Arthur publishes New Species of Uredineae—III. The article includes two species of *Uromyces*, six species of *Puccinia*, two species of *Ravenelia*, one species of *Uredo*, five species of *Aecidium*; total sixteen species. Two third of the species are Trans-Mississippian and the remainder from Porto Rico. The author calls attention to the fact that with the exception of four species the descriptions are incomplete—including but one or two of the possible three, four or even more spore forms. A new species, *Puccinia sieversiae*, adds one to the very few belonging to this genus occurring upon *Rosaceae*. We note that the much-beridden Malvas are loaded with still another *Aecidium* (*Ae. malvicola*)—previously reported and well-distinguished species being *Aecidium tuberculatum* E. & K., *Ae. napaeae* A. & H. (*Ae. callirrhoe* E. & K.), and *Ae. roestelioides* E. & E.

J. BRESADOLA GIVES NINE NEW SPECIES, ALSO ONE NEW GENUS, under the title *Mycologia Lusitanica, Diagnoses Fungorum novorum*, in Broteria Revista de Ciencias Naturaes do Collegio de S. Fiel, 2:87-92, 1903. The new genus is *Hyposcyppha*, a genere *Dasyscypha* differt deficiencia pili genuini in ascomite.

OBSERVATIONS ON THE CYTOLOGY OF *ARAIOSPORA PULCHRA* Thaxter by Cyrus Ambrose King, forms No. 5 of Vol. 31 of the Proceedings of the Boston Society of Natural History, p. 211-245. It is an exhaustive paper accompanied by six heliotype plates. Literature is cited, 40 items, in chronological order from 1881 to 1901. A convenient summary is given covering two pages. The author refers the genus *Araiospora* to the *Peronosporineae*—"but should be placed between *Pythium* and the *Saprolegniaceae*."

IN AN ARTICLE BY FR. BUBAK AND J. E. KABAT, EINIGE NEUE IMPERFECTEN AUS BOEHMEN UND TIROL, Oesterreichische Botanische Zeitschrift, 54:22-31, Jan. 1904, nineteen new species

are described. A new genus by Bubák is included of which he says: Besonderes Interesse verdient die neue Leptostromeen-Gattung *Kabatia* von Lonicera xylosteum L. aus Tirol, welche eine schöne Parallelform zu *Leptothyrium periclymeni* (Desm.) Sacc. darstellt. But the spores are two-celled, strongly curved, sickle-form; the genus belongs in the Scolecosporae.

DIE WIRTSWECHSELNDEN ROSTPILZE, VERSUCH EINER GE-SAMTDARSTELLUNG IHRER BIOLOGISCHEN VERHAELTNISSE von H. Klebahnn, is a volume of 447 pp. issued in 1904 by Gebrüder Bornträger, Berlin. This is a very important work bringing the extensive literature of this interesting subject together, necessarily incomplete however for the past year. The list of publications cited (articles by each author chronologically arranged) includes an alphabetical list of 286 authors.. The General Part includes such topics as Begriff des Wirtswechsels und Vorkommen desselben, Entwicklungstypen, Spezialisierungerscheinungen, etc. The Special Part outlines the history and results of the various experimenters, species by species, beginning with *Puccinia graminis*. An alphabetical index is given of the heteroecious species with their hosts, an Index of the Aecidia, and an Index of host plants.

THE GENUS PUCCINIA IS DISCUSSED WITH REFERENCE TO STABILITY OF NOMENCLATURE by J. C. Arthur in the Proceedings of the Indiana Academy of Science for 1902 (pp. 81-3). The name was used first by Micheli in 1729. Haller used the same previous to 1753 (initial date for priority), and again in 1768 but here not employing binomials. Adanson cites the name in 1763 but does not cite any species — hence the genus is not there established. The next oldest author for this name is Wildenow 1787 — giving the single species *P. simplex*, but the plant referred to was not a Rust; conclusion: perhaps Kuntze's use of *Dicaeoma* is to be followed.

H. W. CONN TELLS BRIEFLY, IN THE FIFTEENTH ANNUAL REPORT OF THE STORRS AGR. EXP. STA. (pp. 92-6), 1903, his results of extended studies on the Bacteria in freshly drawn milk, and points out the wide discrepancy between his work and that of Harrison and Cumming who found 95 per cent of bacteria belonging to the lactic types, whereas Conn detected less than 50 per cent. Reports by the former indicate that the milk ducts furnish bacteria by thousands per cubic centimeter of milk, whereas Conn shows that the uncontaminated milk contains only small numbers. The discrepancies are referred to the use by Harrison and Cumming of *ordinary* gelatin.

KULTURVERSUCHE MIT PAPILIONACEEN BEWOHNENDEN ROST-PILZEN, von Ernst Jordi, Centralbl. Bakt. Par. u. Infek. 2. Ab., 10:777-9, 3 Sept. 1903, extends our knowledge of the bi-

ology of these species, most of the results however simply confirming previous determinations. As Dietel formerly, so here Jordi, found that in case of *Uromyces hedsyari-obscuri* aecidiospores may produce aecidia — “es ergiebt sich daraus ferner, dass die Aecidiosporen im stande sind, teils wieder Aecidien, teils direkt Teleutosporen-lager zu bilden...”

D. MCALPINE GIVES AN ACCOUNT WITH ILLUSTRATIONS OF *OPIOBOLUS GRAMINIS* SACC. and *Hendersonia graminis* n. sp., parasitic on and destructive to wheat, being the disease known as “Take all and White-heads in Wheat”. The publication is Bulletin No. 9, Department of Agriculture, Victoria. It occurs also in other countries “and has recently been discovered in America. . . . Cordley describes a disease occurring in Oregon U. S. A., which has all the characteristics of this one, although only the fungus mycelium has been found.”

DESCRIPTIO ET ADUMBRATIO MICROSCOPIO-ANALYTICA FUNGORUM is the title of a work, auctore D. Romano Adolpho Hedwigio, that unfortunately yet remains unpublished, sometimes cited [“Hedw. f. Fung. ined.”] by DeCandolle in Flore Francaise, 1805, and the circumstances relating thereto so far as known, are detailed by J. C. Arthur under the title, An interesting unpublished Work on Fungi, Torreya, 4:21-3, Feb. 1904. Hedwig, son of the elder Hedwig in honor of whom the journal *Hedwigia* was named, was professor of Botany at Leipzig, and prepared a work on parasitic fungi “with a true talent” which A. P. DeCandolle undertook (unsuccessfully) to have published in Paris. Dr. Arthur who recently examined the manuscript says: — “It is a pity that so admirable a piece of scientific work should have met such an untoward fate. Even after a hundred years its publication would be a distinct gain to science.”

THE MYCOLOGICAL ARTICLES IN *HEDWIGIA*, BAND XLII, HEFT 6, 1903, are as follows: Hugo Glück, Beiträge zur Flechtenflora Heidelberg (Schluss); P. Hennings, Ueber einige interessantere deutsche Hutpilze [perhaps a new species], Einige im Berliner Botanischen Garten 1903 gesammelte neue Pilze [17 new species], Biatorellina P. Henn. n. gen. Patellariacearum, Squamotubera P. Henn. n. gen. Xylariacearum, Ein stark phosphoreszierender javanischer Agaricus (*Mycena illuminans* P. Henn. n. sp.), Ein Sklerotien-Blätterpilz, Naucoria tuberosa P. Henn. n. sp. ad inter; P. Magnus, Ein neues Helminthosporium, Bemerkungen zur Benennung einiger Uredineen in P. und H. Sydow's Monographia Uredinearum.

P. MAGNUS, IN BEIBLATT ZUR *HEDWIGIA*, 42:(305), 28 Dec. 1903, shows that Sydow's use of *Puccinia obtogens* (Lk.) Tul. in place of *P. suaveolens* (Pers.) Rostr. for the rust on *Carduus arvensis*, is not justified. Link's name *Caeoma obtogens* did not appear until 1816 — Sydow's citation “Lk. Obs. II. p. 27 (1791)”

not being correct, for as a matter of fact, "die Dissertatio secunda, in der p. 27 Caeoma obtegens Lk. aufgestellt ist, erschien erst in 1816, im 7. Bande des Magazins der Gesellschaft naturforschender Freunde zu Berlin p. 25-45"; but Persoon published his *Uredo suaveolens* in the year 1796.

THE REPORT OF THE STATE BOTANIST 1902, CHARLES H. PECK, N. Y. State Mus. Bull. 67:1-194, Pl. M, N, 82-4, 1903, contains the usual amount of mycological matter. We note 25 new species and varieties described, mostly the higher fungi; under the subhead of Edible Fungi are given popular accounts of *Tricholoma subacutum* Pk., *T. radicatum* Pk., *T. silvaticum* Pk., *Hygrophorus pudorinus* Fr., *Lactarius luteolus* Pk., *Lactarius dulcis* (Bull.) Fr., *Russula crustosa* Pk., and *Cantharellus dichotomus* Pk.; all of these are illustrated in color.

SUCCESSFUL CULTURES WITH CONIDIA OF *CYSTOPUS CANDIDUS*, as reported by Albert Eberhardt, in the Centralblatt f. Bakt. Par. u. Infek. 2. Abt. 10:655-6, 8 Aug. 1903, gave the following results: from *Capsella bursa-pastoris*, on *C. bursa-pastoris*, *Lepidium sativum*, *Iberis amara*, *Arabis alpina*; from *Capsella heegeri*, on *C. bursa-pastoris*, *Lepidium sativum*; from *Lepidium sativum*, on *L. sativum*, *Capsella bursa-pastoris*; from *Brassica rapa*, on *B. rapa*, *B. oleracea*, *B. nigra*, *Sinapis arvensis*, *Diplostaxis tenuifolia*; from *Arabis alpina*, on *A. alpina*, *A. hirsuta*, *A. turrita*, *Lepidium sativum*, *Iberis amara*, *Cardamine pratensis*, *C. amara*, *Capsella bursa-pastoris*, *Senebiera coronopus*.

THE ARTICLES OF SPECIAL INTEREST TO MYCOLOGISTS in Centralblatt f. Bakt. Par. Infekt. Zweite Ab., Bd. X, 1903, are: Müller-Thurgau, Der rote Brenner des Weinstockes; J. Ritzema Bos, Botrytis parasitica und Tulpenkrankheit; Beauaverie et Guilliermond, Etude sur le Structure der Botrytis cinerea; Ernst Jacky, Der Chrysanthemum-Rost, II; Neger, Neue Beobachtungen über des spontane Freiwerden der Erysipheen-fruchtkörper; P. Magnus, Kurze Bemerkung zur Biologie des Chrysanthemumrostes; Oscar Mayus, Die Peridienzellen der Uredineen; Eberhardt, Zur Biologie von *Cystopus candidus*; Osterwalder, Peronospora auf *Rheum undulatum*; Jordi, Kulturversuche mit Papilionaceen bewohnenden Rostpilzen.

MYCOLOGICAL ARTICLES OF CONSIDERABLE INTEREST published in the Zeitschrift für Pflanzenkrankheiten during 1903 are: D. Iwanowski, Ueber die Mosaik-krankheit der Tabakspflanze; P. Hennings, Einige Beobachtungen über das Gesunden Pilzkranker Pflanzen bei veränderten Kultur-Verhältnissen; J. Ritzema Bos, Der Brand der Narzissenblätter [Heterosporium gracile Sacc., parasitic]; C. J. J. van Hall, Das Faulen der jungen Schösslinge und Rhizome von *Iris florentina* und *Iris germanica* [*Bacillus omnivorum*, etc.]; E. Marchal, Die wesent-

lichsten Ergebnisse einer umfrage über den Getreiderost in Belgium; P. Hennings, Die an Baumstämme und Holz auftretenden teilweise parasitären Blätterschwämme.

DAVID GRIFFITHS DESCRIBES SEVEN NEW SPECIES OF SMUTS, and publishes notes on others, with illustrations, which are based on collections made in 1902 and 1903. See Bulletin of the Torrey Botanical Club, 31:83-8, February 1904.

ERWIN F. SMITH AND DEANE B. SWINGLE HAVE ISSUED A VERY EXTENDED AND THOROUGH STUDY of the Dry Rot of Potatoes due to *Fusarium oxysporum*, cf. U. S. Dept. Agr. Bur. Pl. Inds'y. Bull. 55:1-64, Pl. I-VIII, Feb. 16, 1904. This same disease under the name Brown Disease was formerly (by C. E. Bessey, Science, N. S. 15:274, 14 Feb. 1902) referred to *Stysanus stemonites* which these authors say is not a true parasite.. The economic aspects are dealt with fully but the taxonomic as well receive proper attention. Synonomy with dates and quoted (and translated) descriptions occupies a page. The proper name to be used for this fungus, generally called *Fusarium solani*, is said to be *Fusarium oxysporum* Schlectendal (1824). One of the eight illustrative plates gives outline drawings of the mycelium, spores and germ-tubes.

THE GENUS *POLYPORUS* (THE POLYPORACEAE OF NORTH AMERICA — VI) is handled by William Alphonso Murrill in the January No. of the Bulletin of the Torrey Botanical Club. Of this he makes *Polyporellus*, *Leucoporus*, *Cerioporus*, and *Melanoporus* synonyms. The genus *Polyporus* was established by Micheli in 1729. Linnaeus retained the name *Boletus* for all pore-bearing fungi, and it was Paulet (1793) who securely established the genus. "The general use of *Polyporus* instead of *Boletus* is chiefly due to Fries, who, without knowledge of Paulet's work, 'restored' the name in 1815 and made it popular in spite of Linnaeus". The species of *Polyporus* are mostly small dark-colored plants, attached to fallen branches and decaying wood on or near the ground. But *P. caudicinus* is large and affects living trees. A good synopsis of the 23 North American species precedes the enumeration with comments, synonymy and distribution. Two new names or combinations are made and three new species described.

NEW AND INTERESTING CALIFORNIA FUNGI BY EDWIN BINGHAM COPELAND, Annales Mycologici, 2:1-8, pl. I-II., Jan. 1904, contains descriptions of new species—three of *Coprinus*, one of *Battarea*, and one of *Podaxon*—and notes on *Morchella conica*, *M. esculenta* and *M. hybrida*, also a suggestion as to the *Coprinus* cystidia, namely, that they serve as props or braces to hold the lamellae apart. The author observes that in his *C. alnicolus* there can be no danger of the gills sticking together and cystidia are entirely wanting.

ANNALES MYCOLOGICI, VOL. II. NO. 1, JAN. 1904, CONTAINS the following articles: Copeland, New and Interesting California Fungi; Petri, Naucoria nana sp. n.; Saccardo, Notae Mycologicae; Dietel, Ueber die Uredineengattung Pucciniostele Transchel et Komarov; Sydow, Neue und kritische Uredineen; Rehm, Ascomycetes Americae borealis; Höhnle, Mycologische Fragmente, Fortsetzung; Vuillemin, Le Spinellus chalybeus (Dozy et Molkenboer) Vuillemin et la Série des Spinellées; Salmon, Cultural Experiments with the Barley Mildew, Erysiphe Graminis DC.

ASCOMYCETES AMERICAE BOREALIS, AUTORE DR. H. REHM, Ann. Mycolog. 2:32-7, Jan. 1904, includes notes and descriptions of 16 species of Discomyctes, nearly all of which are new and interesting, collected by Lloyd, Durand, and Harper.

NEUE UND KRITISCHE UREDINEEN, II, VON H. U. P. SYDOW, Ann. Mycolog. 2:27-31, Jan. 1904, includes five new North American species belonging to the genera Gymnosporangium, Phragmidium, Uredinopsis and Uredo. A Gymnosporangium occurring on *Libocedrus decurrens*, California, was referred to (not described) by H. Mayr in "Die Waldungen von Nord Amerika" (1890) as "G. libocedri"—then (in 1898) referred to *Phragmidium libocedri* P. Henn. n.sp. by the latter mycologist. But the specimens destroyed by insects, spores not examined, etc., the Messrs. H. & P. Sydow think "so ist G. libocedri am besten ganz zu streichen." Their species, *G. aurantiacum*, occurs on the leaves of the host named—but Mayr's bildet Anschwellungen an den älteren Zweigteilen. Sydow's species and Hennings' *Phragmidium* may be the same thing, according to the former authors.

ELEMENTARY MYCOLOGY.

W. A. KELLERMAN.

It is intended to furnish a series of paragraphs for those who may wish to take up the general study of Fungi. It will be a brief as well as elementary treatment of the subject, calling attention first to the great number and varied character of the plants included in this group, their general structure and mode of life, and then giving an outline of the groups with such illustrations as may seem desirable for the needs of beginners.

MYCOLOGY.—This term is formed from two Greek words, *myces* meaning mushroom or fungus, and *logos*. The real or original meaning of the first Greek word is *slime* or *mucus*—and of course was used to designate these plants—or the peculiar material which in the early days was not really understood and not at all supposed to be closely allied in fundamental structure and mode of life to our common plants. Some of the plants

belonging to this group are really *slime-like* or of the consistency of thin jelly in their early stage; they are called the "Slime Moulds." But they are not often observed except by botanists, being mostly minute in size, living in retired places, as shady woods, etc., — rotten logs being a favorite habitat of many of the species. Many of the common Mushrooms also are fleshy, that is, of soft consistency — and it is therefore readily understood why the term *Mycology* was formed to indicate the division of Botany which has to do with the group of plants under consideration.

FUNGI.—A suggestion regarding the word itself may be timely. Simple as it is, the term is not always spoken correctly. *Fun'-gus* is to be pronounced like "bo'-gus," with the *g* hard; but the plural, *fun'-gi*, has the *g* soft, and therefore is pronounced "fun-ji" — the accent being on the first syllable, and the *i* in the last syllable long, hence should be pronounced like "eye". The plants constituting this group are numerous and exceedingly varied in outward structure. Those known to all, are the Mushrooms, Toadstools, Morels, Puffballs, Truffles, Rusts, Smuts, Black Knot of Plum and Cherry trees, the "Cedar Apples," Moulds, and Mildews. The Bacteria are usually included in the group of *Fun'-gi*; they are plants of simple structure and exceeding minuteness, but the work they do as agents of fermentation and decay of organic matter, souring milk and curing cheese, disintegrating even mineral and vegetable matter in soils, and as agents of many of the diseases of man and the lower animals, is everywhere witnessed. The various kinds of rots and decays of fruits and vegetables are induced by species of fungi. The common diseases of fruit trees, such as the Peach 'leaf-curl,' Plum 'pockets,' Anthracnose of Raspberries, Grapes, etc., as well as the Ergot of Rye, the Club-root of Turnip and Cabbage, Crown-gall of some of the fruit trees, and 'witches-brooms,' are abnormal growths, or injured tissue due solely to the attacks of various kinds, mostly microscopic fungi. The Yeast plant is another fungus — its simple structure and minute size being in inverse proportion to its usefulness — having been cultivated from time immemorial and like other domesticated plants as Maize, Wheat, Olives, etc., not known in the wild state. The existence of still another large group of parasitic fungi is witnessed by the "Leaf spots," or little areas of dead tissue in living leaves of many herbs, shrubs, and trees during the growing season. A leaf may be so severely attacked as to succumb entirely — large irregular areas of dead tissue soon manifest, then the entire leaf turning yellow and dying; the young twigs also are sometimes involved. The fungi themselves are invisible — the destructive work only revealing their presence; a microscope is necessary for their detection.

VEGETABLE LIFE.—An epitome of the known processes of life and growth of our common plants, and their minute structure may serve as a basis for brief explanation of the structure and mode of life of the Fungi. The herbs, shrubs and trees develop roots in the soil which terminate in minute fibrils that push out between the finer particles of which the soil is composed. These tiny rootlets have near their tips, during the growing season, an abundance of slender tube-like outgrowths, called *root-hairs*. These delicate elongated *cells*, as such structures are called, apply themselves closely to the soil particles and absorb the thin layer of adhering moisture. This moisture or water has passed previously through the atmosphere—falling as rain or water on the surface, then slowly percolating through the soil, dissolving very small quantities of triturated rock (for that is what soil mainly consists of) and some of the partially decomposed organic matter that may also be present. Water is not a good solvent for granite and marble, nor even for the softer limestone, but its disintegrating power is greatly increased by the carbon dioxide and traces of other gases it absorbs in passing through the air, but especially by the larger quantity of these substances, together with various alkalis which it takes up in percolating through the soil. It therefore happens that ample food materials for our common plants is held in dilute solution in this thin layer of moisture which the root-hairs seek and abstract from the soil particles. The root-hairs—like all other ordinary living vegetable cells—consist of an active, more or less granular but nearly transparent substance, in consistency somewhat like thin jelly, detected but little over half a century ago and given the name of *pro'-to-plasm*. It is this—the physical basis of 'life' as interpreted to-day—which does the work of absorption—pulling the water-particles away from the attracting soil particles and appropriating the booty for its own use. The cell 'wall,' or tube (covering) referred to above, is permeable to liquids allowing the water to pass readily. Whether this absorptive power of the protoplasm is referable simply to the physical process called 'osmosis' need not concern us here—it is exhibited at any rate only in the *living* protoplasm. The roots, stems and leaves are made up exclusively of cells—that is, tiny masses of protoplasm with a delicate covering or wall (the material of which is cellulose) which are joined to one another to make the firm plant body. Moreover the cells have taken on various shapes, round, angular, elongated, etc., and some of the walls become much thickened, often hard, and thus the plant body is complex in structure—though in the very early stages of its development it was comparatively simple. Now, the water, which contains the food-material in solution, passes from cell to cell—through the walls and through the protoplasm, reaching

finally the leaves and other green parts of the plant. Here in the presence of sunlight, the material is decomposed by the protoplasm, new compounds are formed, and these further changed by processes, not yet fully understood, into products also not yet physically and chemically elucidated. But the digested material finally undergoes assimilation, or change into the vegetable fabric of the plant body.

RESPIRATION. — So important a life process as the consumption of oxygen deserves brief but special consideration. Taking carbon dioxide from the air and various other food materials from the soil, was outlined in the previous paragraph; the decomposition of these substances into simple elements and recombination into simple and complex compounds, which takes place in the protoplasm of the common plants, in those cells in which chlorophyll is present — the energy derived from the sun (i. e. light energy) appropriated for the performance of this important work, — have also been briefly mentioned. But this complicated work is done only when an ample supply of oxygen is at hand. If no air (oxygen) is present in the soil, the root-hairs and the rootlets are unable to perform the work of absorption. If the leaves are deprived of oxygen the protoplasm in their cells likewise ceases its activity. Not only common observation, but accurate experiments as well, indicate the necessity of oxygen to the performance of what we call the vital activities. It is true for all organisms — whether vegetable or animal, whether simple or complex in structure or form.

LIFE-OUTLINE OF A FUNGUS. — The fungi are simple in structure and destitute of green matter — a substance that will hereafter be referred to as *chlo'-ro-phyll* (the word itself meaning 'leaf-green'). They manifest simple life processes, though fundamentally these are the same in all organisms whether plants or animals, whether the structure is simple or complex. The most conspicuous distinction when contrasted with the common plants is their lack of chlorophyll; fungi may be hyaline, white, black, brown, yellow, or almost any other color, but never green, at least they are not green like common vegetation in which this universal coloration is due to the presence of chlorophyll in the cells. Evidently then their mode of life is very different; they can not manufacture their food material out of carbon dioxide, water, and other mineral substances. Consequently they must get their food — already prepared or partly digested — directly either from living plants or animals, or from the organic matter in which the life-processes have ceased to manifest themselves, the so-called dead matter. If they take their food from living organisms we say they are *parasitic*, but if they affect dead matter (which they decompose to greater or less extent) we say they are *sap-ro-phyt-ic*. Whether they obtain food from living or-

ganisms or decaying matter the fungi may inhabit only the surface of the host or matrix; the absorption may be direct or suckers, usually very simple, may be developed that penetrate to some depth. They may however reside only in the interior of the host, or deep-seated in the nourishing substance. An example of the former is seen in the common Leaf Mildew a whitish or later dingy coating on leaves of the Lilac or of the Cherry; of the latter may be mentioned the bacteria that cause splenic fever or tuberculosis. Some fungi may live on the surface in part and concealed in tissue in part. The oxygen necessary for the activity of these organisms may be taken from the atmosphere or in case of some of the simpler fungi it is abstracted from the tissues or the mass of organic matter they occupy — necessarily disintegrating or decomposing the latter.

STRUCTURE OF FUNGI.— Special structures or organs of plants and other organisms have doubtless arisen in response to their needs; it is plain at any rate that the organs are in general adapted to the functions to be performed. The slender tubular root-hairs of the land plants are well fitted to absorb moisture from soil particles and the leaves by their expanded form and peculiar structure take carbon dioxide from the air, exhale moisture and collect the oxygen necessarily consumed in the liberation of energy requisite for the performance of various processes. Such forms and mechanical structures as trunk, stem, branches, and twigs, or leaf stems, are developed for the support of the leaves which must be hung out to the sun and bathed in the air. So important physiologically is this display of foliage that the modern botanists describe the leaf as a 'light-related organ' and refer its peculiar structure to the character of the work to be performed. The floral leaves — using this word to include all the organs of the flower—have very different and peculiar functions to perform, and they in turn are of such form and structure as suits the work to be done. Now, the Fungi gain their livelihood without chlorophyll — hence possess no leaves; having no leaves to support and display, they have need of no twigs, branches or stems. Resting on other plant bodies or growing within tissues their cell walls need not be lignified, need not be thickened nor of large dimensions. As a matter of fact the plants of this group are often extremely simple as well as very minute. Even when they are large, as for example a Mushroom, the cells of which they are composed are very simple and homogenous as compared with what is found in the varied and complex tissues of a vine or a tree.

ALGAE.— When contrasted with Algae (pronounced *al'-je* — the *g* having the sound of *j* in the word *jeer*), which are closely related in structure to the Fungi, the conspicuous difference is in the presence of chlorophyll in the former and its

absence in the latter. In botanical classification the Algae are generally placed lower than the Fungi, but while an Alga (here the *g* is hard as in the word *toga*), in case of some species, consists of a single small cell, some of these aquatic plants are very large and remarkably complex in external form and internal structure. As examples of the latter, may be cited the conspicuous Marine Algae, the so-called Sea-weed, Sea-moss, the Kelp, Sargassum, etc., as well as our common fresh-water Stone-worts, or Chara. The latter species consists of upright green plants, six to eighteen inches high, growing under water in clear shallow lakes or ponds, with their numerous regular branches in successive whorls, disposed at regular intervals on the stem. The species which form the Pondscums, or Green-felt in standing water, and the bluish-green, somewhat slimy coating on mud, or on the water's margin in muddy pools, are less complex than the Red or Brown Algae of salt water, or the ornamental Chara mentioned above. It is scarcely necessary to add that the Algae manufacture their own food out of inorganic materials—not being dependent on other organisms as the Fungi are, they are of course never parasitic. Aside from this physiological difference the two groups are remarkably alike and by many botanists are placed side by side—the lower Algae with the lower Fungi, and so on through the entire series—all together forming one of the large groups of the Vegetable Kingdom.

FUNGI DERIVED FROM ALGAE.—In the evolution of the vegetable kingdom it is reasonable to suppose that the simple Algae—possessing chlorophyll and being able to convert mineral matter into organic food and fabric—preceded those plants destitute of chlorophyll and which therefore could not live independently. Besides, thorough study in plant morphology and phylogeny (unfortunate words to use here but they will be elucidated later) has led botanists to the conclusion that the Fungi have actually descended from, i. e. really grown out of the simple Algae,—and it is believed also that from this same group of interesting plants, the Algae, our Higher plants have originated, even our Ferns and common Flowering plants! We can easily conceive that the simple Blue-green Algae living in stagnant pools where the water is highly charged with decaying or partially decomposed organic matter, may directly absorb some of this as a part of their food. Having then less need of the chlorophyll, some forms may have, in the course of a long series of generations, entirely lost this important green substance—when they would be called Fungi. Or if we imagine that a sudden change, a ‘mutation,’ took place, due to the ‘rhythmic’ flow of life, or to the ‘inherent’ tendency to variation in successive progenies, yet we would think the evolution took place along the line suggested—namely, Alga to Fungus.

(To be continued.)

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NOTES.

Though, in the language of a correspondent, "The Index [to North American Mycology] certainly covers the ground in good shape and does not leave anything more to be desired" [the compliment is appreciated!], — it would doubtless be a matter of advantage to all mycologists for the indexer to receive the suggestions of everyone who sees any possible point of vulnerability in the plan or execution, with a view to improvement. Temporary omissions will doubtless always occur, but publishing frequent installments makes prompt completion feasible. Notices of any omission or other mistakes are earnestly solicited. I may say that giving "ground" and other too vague matrix for the higher fungi will not be continued, considered quite useless.

I wish to thank Mr. P. L. Ricker for suggestions and for kindly calling my attention to certain corrections which have now been made. I may add that he finds it a good plan to divide the card index (made by clipping the items from the Reprints and attaching to library cards) into three parts, namely, (1) Hosts; (2) New species, new genera, synonymy, culture work for named species; and (3) Subjects.

THOSE who have not practiced till perfect in pasting slips on library cards, might perhaps profit by the suggestion, that when these are narrow as in case of the items from the Index of North American Mycology, and attached (of course by paste at the ends only) near the upper edge, it is desirable to add near the lower edge of the card a narrow slip of paper (should be cut from the margin of the same pages, because of same thickness) — otherwise there is unequal thickness above and below in the pile or row of cards in the drawer.

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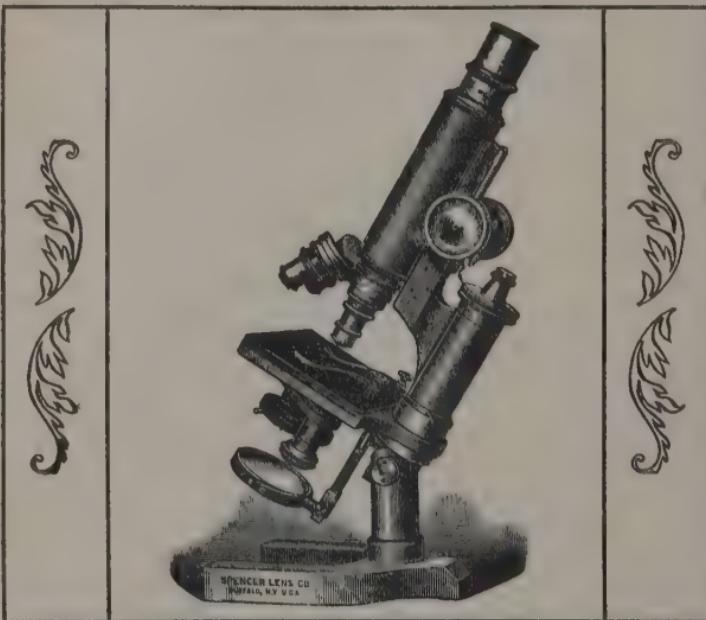
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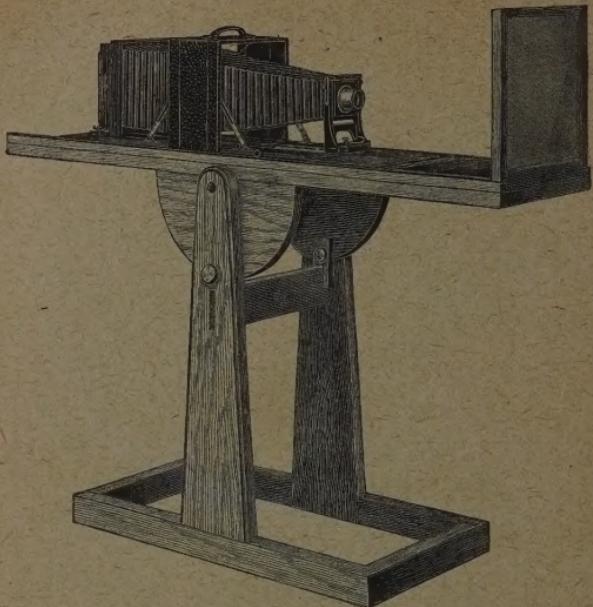
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